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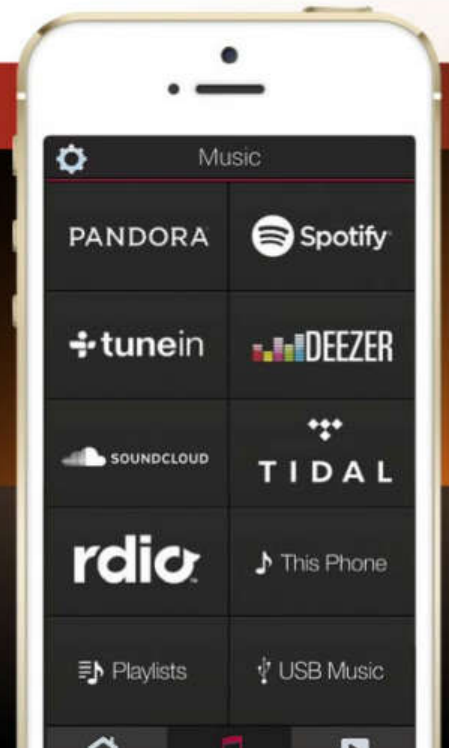
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LATEST NEWS

Getting the whole story...

I read an article (well, a blog) just recently which whinged about the IFA show in Berlin as being somewhat short on news and major launches, with little but iterative releases of ongoing product. Poor bloggie diddums — I fear this is a sign of a jaded author rather than a jaded show. I don't remember *ever* having so many news stories all piling in close to press day as they have for this issue, and many of them have come out of Berlin. For sure, if you only go searching for 'the next big thing', it may not always stare you in the face or come to you on a handy platter, even at a big event like IFA. And yes, when the marketers can't deliver a 'next big thing' then they'll fall back on the little things — blacker blacks for this year's tellies, higher power ratings for this year's amps, app control of everything (whether actually useful or not), *et cetera, et cetera*.

So sometimes you need an overview, to make the connections between these small releases. Take the strong focus at IFA on connected devices and the 'internet of things' — the many such products there may be small and only moderately exciting devices on their own, but in the context of news from elsewhere on Apple's development of HomeKit and Google's OnHub (see p10), well that's about as big a story for the future of DIY smart homes as you could imagine. (I also read this month that the phrase 'smart homes' is now considered *passé* in some circles, but since that writer neglected to define a substitute, forgive me for hanging on to this useful phrase in our coverage of the CEDIA Awards this issue, starting on p15.)

We have Panasonic switching to its third screen technology in as many years — plasma was best until it stopped, then LED-LCD was good, now the company has (we're delighted to see) introduced an OLED range. Meanwhile all manner of wireless multiroom platforms are arriving or updating — more HEOS hardware and an improved app, Bluesound moving to a second generation, Yamaha's new and apparently powerful MusicCast, and even (I can tell you this only because I haven't signed their alarming Non-Disclosure Agreement, which would, right now, stop me) a long-awaited replacement for the Sonos Play:5 speaker unit.

In any case, we can get way too tied up in news, and new things, in the search for the next big thing. Your system may not need a next big

thing — it might benefit most from something as mundane and un-newsworthy as room treatment, or recabling, or a temporary music subscription to bring a burst of new music discovery to your life.

Or how about a subwoofer? This may be an addition not even considered, especially for music systems, since subwoofers are so commonly just lumped in with surround sound, where of course they are absolutely essential to deliver that 0.1 bass channel and do the dramatic action stuff. But just as they can also augment less frenetic soundtracks, subwoofers can bring subtle wonders to a music system as well — even to those with floorstanding speakers. Really low bass content in music is rarely at a high level, so that adding a subwoofer is not an in-*yer-face* thing, not something to keep the neighbours up at night, not necessarily a 'wow' moment. Like those iterative-product news stories, it's more a question of getting the whole story in place — a mental 'click' as the pieces connect and you realise there is a new scale and realism of presentation from your system which can transform some of your favourite recordings and how you enjoy them.

One of the bugbears of subwoofers has always been setting them up, finding the best positioning in your room and particularly getting the integration right with your main speakers. To do this accurately has long been a professional job, given the cost of equipment like real-time analysers. But guess what — there's now an app for that, several indeed, and Greg Borrowman walks you through the new-tech sub set-up process on p56-57. And don't worry, it still involves traditional processes like crawling around the floor with a roll of white masking tape.

So there you go — in an age where convenience is king and so many people are opting for compact audio systems, we invite you to buck the trend and BRING BACK THE BASS. Perhaps your 'next big thing' (although also available in relatively compact varieties) may be a subwoofer, even one that isn't freshly launched or recently reiteratively relaunched. When it does the job for you of delivering the whole story, enhancing your musical joy as well as making some movie mayhem, you may just be rushing to tell everyone the news.

Cheers,
Jez Ford, Editor

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LEN WALLIS AUDIO

THE HI-FI HEADLINES

NEWSLETTER No.222

It is natural when thinking about Hi-Fi to think in terms of major components, such as amplifiers, speakers etc. At the same time there are many smaller components and accessories that go into the fabric of this market, and we have had a bunch of these come through in recent times.



Headphones are big business at the moment, with many non-headphone companies entering the market. One of the most impressive has been **AudioQuest**, with the **NightHawk** (\$895). The amount of engineering that went into this product is certainly impressive – particularly given that AudioQuest is a cable manufacturer.

The other significant headphone release has been the **P5 Wireless** (\$599) from B&W. Based on the very popular P5 (cabled) headphone this Bluetooth version offers both performance and convenience.



Another product packing an amazing amount of technology into a very small space is the **Explorer² USB DAC** from Meridian. It has been some time since the Explorer has been available in Australia, but the Explorer² is a solid step forward on the old model. This minute DAC, designed to fit into the USB port of a computer, has 24bit/192kHz processing,



and is MQA (you will hear more about this in the future) enabled. Possibly the best news is that under an exclusive arrangement with Meridian we are selling this remarkable product at \$399 – less than it sells for in the UK. Fantastic value.

Also amazing value is the **DeepBlue² Bluetooth loudspeaker** from Peachtree. While certainly not the cheapest example of the genre on the market it is far from being the most expensive, but it has been hailed by numerous reviewers as being the best out there, and we tend to agree. The performance that manufacturers are achieving from this category of speaker is amazing, and there is no better example than this. The **DeepBlue²** sells for \$649.



Peachtree Audio's DeepBlue² Bluetooth Music System, \$649



Astell and Kern is an unlikely success story (a \$5,000 portable digital player??), but it goes to show that if you produce the best quality out there you will find a market. We have recently received two new products from this manufacturer of extreme quality portable digital recorders. The first is the **AK380** (above), which sells for \$4,799 – an amazing player – and the second is their new 'budget' player, the **AK Jr**, which sells for \$699. Both are exceptional products, the AK380 as an example of how much high-end technology can be incorporated into a very small space, and the AK Jr for its value.



While this product does not really qualify as Hi-Fi, it comes close, and is certainly part of the category of the moment. **HEOS** is one of the major wireless speaker brands at the moment, and they have just released their new **HEOS 1 speaker**, plus the 'Go Pack' – which converts the HEOS 1 to a portable splashproof speaker – and their long-awaited Soundbar, which comes with a wireless subwoofer for \$1,500.



We have just received a limited range of furniture from an exciting new British manufacturer, **Custom Design**. Audio furniture in Australia has by and large fallen into two camps: very high quality and expensive, with Germany's Finite being a great example, or at the other end of the price/performance scale (yes – the rack you sit your Hi-Fi on will have an influence on its performance). Custom Design fills the middle ground beautifully. At this stage we have limited stocks, but this will grow with time.

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Yamaha's **MUSICCAST** has a Bluetooth bonus

Yamaha has used an old name for a new product — MusicCast is the new wireless multiroom platform with which it will take on the likes of Sonos, HEOS, Bluesound and the rest. While it has taken its time getting the system to market, it has strong differentiators to give it an edge, not the least of them the enormous range of device options on offer that will integrate with the app-control MusicCast — 25 different AV receivers, two hi-fi amplifiers, two audio systems, two wireless speaker systems and three soundbars... and that's just what's available during the initial launch roll-out.

The other big news is that MusicCast can send music to any Bluetooth speaker/device you already own, irrespective of make or model. This may leave competitors somewhat agog — Sonos can't even accept *incoming* Bluetooth, while others (HEOS and Bluetooth generation 1) require a USB dongle to do so. Yet here Yamaha has taken a simple idea from the TV market, equipping MusicCast products to SEND via Bluetooth pairing with any Bluetooth speaker/s or headphones. So if you have one of the MusicCast soundbars in your lounge, say, it can pair with any Bluetooth speaker in the next room and then you can use the MusicCast app to send music to that too.

The obvious limitation on this will be the range of Bluetooth, which is generally fine in the same room but can become rapidly iffy once walls start getting in the way. But that aside, this ability gives Yamaha an ecosystem of potentially thousands of possible devices, including those already in people's homes. Bluetooth speakers have become enormous sellers in recent years; now Yamaha can address them all. We've noted in our reviews of wireless multiroom system that those based on third-party platforms have a considerable benefit in allowing other brands to join the system if they use the same platform (for example, DefTech and Polk both use DTS PlayFi... Panasonic, Monster, Hitachi and Medion use Qualcomm AllPlay... Bush Australia, Ruark and Sangean are all using Frontier Silicon's

UNDOK). But with MusicPlay's ability to send music via Bluetooth as well as receive it, Yamaha has left the platform business entirely.

Remember, you have to pair each Bluetooth speaker with a specific MusicCast device, and as we understand it, it's one to one — you can't have one MusicCast device talking to half a dozen other-brand Bluetooth speakers. But in terms of saving redundancy when choosing a multiroom system, it's a pretty big bonus.

Yamaha's system is also very input friendly — only a few systems so far have allowed you to share more than a simple external input, but with MusicCast on a mini system, you can share CD and radio. With MusicCast on your receiver, you can select any input

you wish. Format lists bode well for NAS operation, MusicCast supporting MP3, WMA, AAC, Apple Lossless, AIFF and FLAC (up to 192kHz/24-bit) and the receivers and 'hi-fi' products also supporting DSD. There is even back-compatibility, so that some recent Yamaha AV receivers may be firmware updatable to become MusicCast products. See Yamaha's website or AVHub.com.au for the list of these.

Though we've had a demonstration from a clearly stoked Yamaha Australia team (and enjoyed the sound from the 'Studio' NS-N500 wireless speakers pictured above), we await review samples before judging such essentials as the operation of the app control system and how well it all works as a system.

More info: au.yamaha.com

Bluesound's generation 2 is on the way

A second generation of the Bluesound wireless multiroom system will expand its abilities and introduce two fresh speaker unit models at lower price points than the original Pulse.

Updates include a **Node 2** (digital and line-level outputs into an existing audio system), a **Power Node 2** (just add speakers), and a **Vault 2** with its internal CD ripper and a doubled 2TB hard drive plus add the usual Bluesound streaming abilities. All these now have new designs (by designer David Farrage of DF-ID) with less of the crazy angles in evidence, and will use upgraded DACs delivering 32-bit/192kHz performance, and also built-in Bluetooth including aptX.

These will be joined by a trio of new wireless speaker units — the expected **Pulse Mini**, also a **Pulse 2** to replace the current Pulse, and a new smaller **Pulse Flex**, which can be placed horizontally or vertically and which can be paired for stereo operation. All the new units are, of course, fully back-compatible with existing Bluesound products.

www.convoy.com.au



Just a teaser of news as it breaks — an all-new B&W 800 Series Diamond has just been announced, with the company's entire manufacturing plant in Worthing, UK, redesigned specifically for production of the new series. Slender, more modern industrial design and a host of tech within will arrive first in the 802, 803, 804 and 805 D3 models from October, with the 800 D3 due in our autumn 2016.



IoT hubs

Who will rule the 'internet of things'? Our focus last issue on connected things for smart homes presaged a three-fold announcement of smart-home hubs from major players who are bypassing the connected products themselves to deliver central controllers that will link a variety of products, thereby getting over the 'island' issue we encountered when testing individual brands.

Apple's HomeKit was initially announced a year ago but the development kit for the new iOS 9 extends the ability for iOS users to set up and control HomeKit-enabled accessories easily and securely with Siri and third-party apps, including expanded support for different accessories and remote operation via iCloud. Key to its success will be a new "Works with Apple HomeKit" badge to identify compatible products.



Google's OnHub is an unusual design of router offering speedy Wi-Fi, but its specs (dual-core 1.4GHz processor, 5GB flash memory and compatibility with Bluetooth Smart Ready, 802.15.4, Weave and ZigBee/Thread) make little effort to hide the likelihood that this is a Trojan horse ready for a collection of 'Works with Google OnHub' products.

At IFA in Berlin, Samsung also delivered a newly-upgraded Hub for its SmartThings platform, including new sensors for doors/windows and motion/presence, and a new iOS/Android mobile app. It claims to now support nearly 200 compatible devices and includes video monitoring which is "compatible with select Samsung and D-Link cameras".



TCL spreads its curves to 100 inches at IFA Berlin

TCL had its usual spectacular mix of current and future screen technologies on show at IFA Berlin, including a 110-inch curved 4K/UHD TV China Star with backlit LED-LCD display, entitled 'China Star'. The diagonal of this monster is almost 2.8m, and at three metres it fills a 55-degree field of view — that's a cinema level of immersion. The pole mounting looks neat, bearing in mind this TV's specs say it weighs 425kg. Yowsa.

TCL also continued its championing of quantum dots for delivery of extended colour gamuts, working with its subsidiary CSOT and US-based QD Vision to demonstrate the H9700 series, "the First Commercially-Branded Television to Present Over 90% of ITU Rec. 2020 Color Gamut", a color gamut almost twice the size of today's industry standard.

Also on show was TCL's 8800 series, its first curved 4K sets, as reviewed here last issue (review at www.avhub.com.au). More: www.tclelectronics.com.au

Media players plus

Two new TV boxes are arriving, one very well publicised, one less so yet. First is the new Apple TV. Aside from more integrated services and a snazzier remote



(though we thought the original remote was a miracle of simplicity), the advantages of the new model have yet to reveal themselves — the lack of 4K is not unexpected, but the removal of the optical digital output is not friendly to hi-fi fans. But with roughly the grunt of a PlayStation3 inside, and games developers seemingly entranced by the development kit, the new Apple TV seems to have a destiny as a major new console in the games market — the Nintendo Wii for the next generation? More info: www.apple.com.au

Meanwhile Telstra has announced the end of its T-Box series, to be replaced for new Telstra customers by a Roku-equipped video set-top box. Roku has long been an established player in the US, including a simple stick receiver akin to (but preceding) Google's Chromecast, but most of its services

were not available to Australians (except via VPN or DNS masking). Now Telstra's version of the Roku 2 set-top box (below) will offer access to Netflix, Stan and Presto, as well as rentals from BigPond Movies, and access to some of the thousands of apps available to Roku's US and UK users. It also supports Miracast and other casting systems, while offering microSD and USB slots for additional storage. But it's not a PVR — it does not receive or record free-to-air TV. The box should be available to subscribers by the time you read this.

More info: www.telstra.com.au



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Panasonic goes OLED

At the IFA technology show in Berlin, Panasonic previewed the new TX-65CZ950, a 65-inch 4K OLED screen, to be released this month in Europe. The CZ950 combines its OLED panel with Panasonic's 4K Studio Master Processor, "advanced professional-level processing power".

Panasonic's IFA presentation made far more of the 4K Pro picture engine than the OLED panel itself, which likely indicates that the panel itself is coming from LG.Display. While LG Electronics currently holds a large-screen OLED monopoly in Australia, LG.Display is a separate company and has already been supplying its OLED panels to other TV brands — the first was launched by China's Skyworth in 2014.

The question now is how well Panasonic has managed to apply its own processing expertise, some of it passed down from Pioneer's Kuro engineers when that company exited the TV market, in order to create something still more exceptional in the OLED line than the top performers we've already seen from LG. As Panasonic says, "Getting the most from OLED means driving it with advanced picture processing capable of unlocking its full potential — which is where Panasonic comes in."

To this end Panasonic has worked with renowned Hollywood colourist Mike Sowa, best known for his work on films such as 'Oblivion' and 'Insurgent', to tune and approve the new TV's picture quality. He says that "Panasonic has engineered their newest 4K Pro OLED TV to a standard that I would only expect in professional displays."

Panasonic notes that this TV has been certified by THX — making it the first ever 4K OLED TV to be so certified by THX.

The company also claims it has improved the already impressive blacks of OLED by improving the stages just above absolute black.

"OLED's ability to deliver a new level of black level response — which Panasonic calls Absolute Black — has actually been a challenge for OLED TV makers, since the shift from complete blackness to just above black is a very difficult gradation step to render," claims the company. "However, Panasonic's experience with plasma technology has enabled it to solve the issue on the TX-65CZ950, resulting in unprecedentedly beautiful and precise detailing even in the very darkest picture areas."

No word as we go to press on Australian release or pricing, but in Europe it's expected at €10,000 euro — and comparing other TV prices, that might translate to a premium A\$17,000.

More info: www.panasonic.com.au



It's a new Technics turntable!

One of the biggest instant buzzes from IFA 2015 came with Panasonic's announcement that it has reversed its decision to end Technics turntable production — at least long enough for this prototype to emerge.

There have been online petitions for the company to bring back a version of the classic DJ SL-1200, which was in production for 35 years from 1972 up to the last version, 2007's SL-1200MK6. Those sites and Facebook pages are now celebrating the announcement — while also wondering what exactly they're likely to be getting. The new incarnation of Technics has, after all, been pitched at a mid-to-high-end hi-fi audience. Panasonic relaunched the brand at IFA last year with some relatively high-end kit, and this year has added a new Grand Class Series consisting of the SU-G30 Network Audio Amplifier and ST-G30 Music Server.

The prototype turntable on show at IFA 2015 in Berlin is direct drive, currently heavy on the aluminium and light on the tonearm, but the whole Technics turntable concept "will be re-built with new elements at every level", with Michiko Ogawa, director of Technics and executive officer at Panasonic, telling *Wired UK* magazine that "Turntables are a very iconic product for the Technics brand... The turntable market is very small but it is a very important brand product."



Epson's new TW5000 series

Epson used IFA in Berlin to promote its remarkable new EcoTank printers (with well-priced longlasting ink replacement, hoorah), while also showing its LS10000 projector (reviewed in our June-July issue) and introducing an intriguing

new EH-TW5000 series with some potentially highly affordable full-HD home projectors. The EH-TW5300 is one that is due to launch in Australia in October, price to be advised, but given a €699 price and US\$799 (pre-tax) in the US for the equivalent

Home Cinema 2040, we might hope to see it in Australia around the thousand-dollar mark, highly impressive for the quoted specs. Watch AVHub.com.au for news or www.epson.com.au





No 4K Blu-ray for Christmas

One thing that IFA Berlin didn't deliver was the expected Ultra HD Blu-ray announcements. We had our suspicions that the Blu-ray Disc Association's finalisation of a 4K standard had simply come too late for manufacturers or studios to get product in the shops for Christmas, and so it has proved.

No promises for launch came from any of the major brands at the IFA exhibition in Berlin, which was the expected launchpad for any end-of-2015 4K Blu-ray release. Panasonic, which had a prototype 4K player on show back at CES in January, seemed in pole position to have a working production player to announce, but made no mention of it at all, concentrating attention instead on its announcement of a 4K OLED television (opposite).

Pioneer, Samsung, Sharp, Sony and Toshiba are also members of the Blu-ray Disc Association, so are well-placed to bring players to market, Sony especially so, given that the day job of Victor Matsuda, chair of the BDA Promotions Committee which announced the new format, is as Vice President of Blu-ray for Sony America. He had previously implied a pre-Xmas release.

Only Samsung had a 4K Blu-ray player on show at IFA, but the company was vague about pricing and launch dates, other than saying it would be in 2016. It did indicate that the machine will be set up for 4K streaming as well as disc replay, promising European involvement with Netflix, BT, Amazon and Canal Plus. 20th Century Fox was present at IFA to promise several titles on 100GB UHD Blu-rays, again without specifying timing.

BDA studio members also include Universal Studios, The Walt Disney Studios and Warner Bros. Entertainment, so the software market should be well-primed to get 4K discs on the market once the floodgates open, especially since Hollywood has been remastering classics in 4K for years, although robust authoring tools for the software are likely still being finalised. But there are also concerns about a collapse in the current disc market for DVDs and Blu-rays in Europe affecting the enthusiasm behind the speed and scale of a UHD Blu-ray roll-out there. And every delay gives 4K streaming services more time to get ahead and establish themselves as an alternative to discs.

The new Blu-ray players will be entirely back-compatible with existing Blu-ray discs. But the Las Vegas Consumer Electronics Show in January now looks to be the place we'll learn of actual players, prices and release dates.

For more on IFA Berlin, check our stories at AVHub.com.au

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Dealer: Automation Associates

WINNER 2015 CEDIA AWARDS
"Best Media room under \$25,000"
Dealer: Smarthome Solutions

FINALIST 2015 CEDIA AWARDS
"Best Media room under \$25,000"
Dealer: The Digital Picture

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THE CEDIA AWARDS recognise the finest custom installation work delivered each year by members of CEDIA — the Custom Electronic Design & Installation Association. CEDIA is a global entity, with our region including Australia, New Zealand and the wider Asia-Pacific area, including China. The winners represent the state of the art in home cinema and smart home design — pictured is the theatre and music room from the home that won Brisbane's Electronic Living the top Integrated Home award this year (see p19 for more).

CEDIA Award Winners 2015

It was all change at the CEDIA Awards this year — entries for the finest custom installation projects in Australia, New Zealand and the wider Asia-Pacific region were all submitted through the U.S. head office of CEDIA, where they were judged by a committee of U.S. luminaries before the winners were announced at a local CEDIA event in Melbourne, held to coincide with the Integrate Expo there in late August.

Regular readers may recognise some of the winners here as entries that were also made in

the previous 2014 Awards — some projects had been updated, but others were allowed a second 'go' following the decision to change the whole submission process for 2015.

The category list is curtailed for 2015, with only two categories of Integrated Home (above and below \$150,000) and two for Home Theatre (also above and below \$150,000), plus categories for Best Media Room

under \$25,000, Best Personal Craft, and two documentation awards, one for wiring and one for AV Documentation. The usual gongs for 'Winner' and 'Highly Commended' have become 'Winner' plus 'Finalists'. No awards were given this year for Showrooms, commercial work or 'Special Projects'.

Our thanks to our friends at CEDIA and congrats to all the winners, some of whom we hope to feature in detail in upcoming issues of Sound+Image. More info: www.cedia.org

CEDIA Awards

And the winners are...

HOME THEATRE, LEVEL ONE (under \$150,000)

Joint Winner: Automation Associates
Joint Winner: Beijing Tian Hai Bei Fang
System-Integration Tech

Finalist: Zene Private Theater

HOME THEATRE, LEVEL TWO (over \$150,000)

Winner: Home Control and Audio
Finalist: Wavetrain Cinemas
Finalist: Zene Private Theater

BEST MEDIA ROOM under \$25,000

Winner: Smart Home Solutions
Finalist: The Digital Picture

INTEGRATED HOME, LEVEL ONE (under \$150,000)

Winner: Digital Residence
Finalist: Zentec

INTEGRATED HOME, LEVEL TWO (over \$150,000)

Winner: Electronic Living
Finalist: Automation Associates
Finalist: Liquid Automation

BEST PERSONAL CRAFT

Winner: Liquid Automation

BEST WIRING DOCUMENTATION

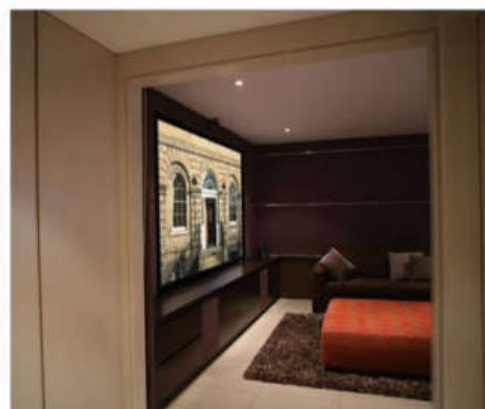
Winner: Liquid Automation

BEST AUDIO VIDEO DOCUMENTATION

Winner: Home Control and Audio



1 This Auckland installation from **AUTOMATION ASSOCIATES** is one of the entries making a return from the 2014 awards, this time winning the gong for Home Theatre Level One (under \$150,000). It's a cinema carrying the hallmarks of Wavetrain Cinemas' careful sound isolation, extensive acoustic treatment and high level of equipment — this room was part of a whole home installation by AA. www.aa.net.nz



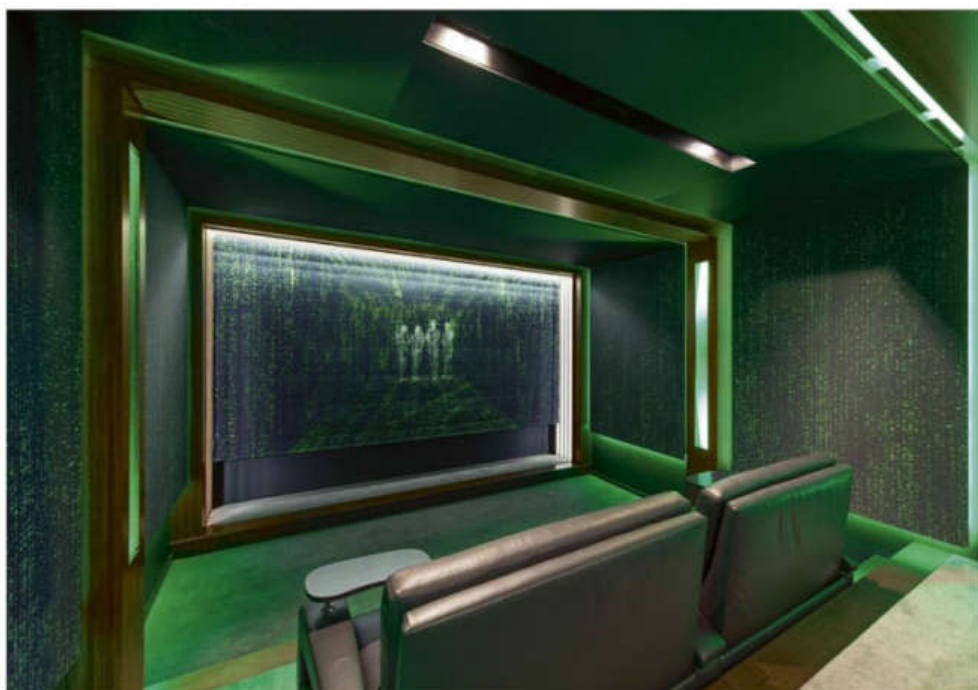
3 **SMART HOME SOLUTIONS** worked with Wavetrain Cinemas on the acoustic package for the winning Media Room pictured below, overcoming the difficulties of hard floor tiles and a bar at the rear to achieve reportedly brilliant results with audio using an Integra receiver and Triad Bronze speakers, and video on a 96-inch SMX screen. www.smarthomes.com.au

HOME CONTROL AND AUDIO won CEDIA's top Home Theatre category with this spectacular cinema designed in collaboration with Wavetrain Cinemas. We featured this installation in detail in our Oct-Nov issue last year, and the music concert-loving owner has since had its performance upgraded to a 7.1.5 system running from a Trinnov processor capable of delivering not only Dolby Atmos soundtracks, but Auro-3D and DTS:X as well. Impeccable room treatment combined with reference-level performance to take out this key award. www.homecontrolandaudio.com.au

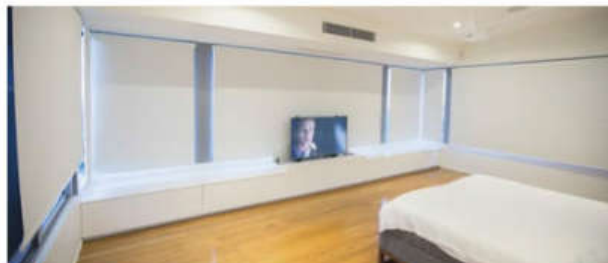
2



See this whole project online at
www.avhub.com.au/matrix



2 WAVETRAIN'S amazing 'Matrix' home cinema was a finalist in the Home Theatre Level Two category, recognising the fastidious design and top standards of fit-out by Wavetrain and Instinct Electrical, including themed 'digital' wall art from Warren Macris, and an adjoining bar that takes design cues from the 'Cube' Canadian sci-fi thrillers. www.wavetraincinemas.com.au

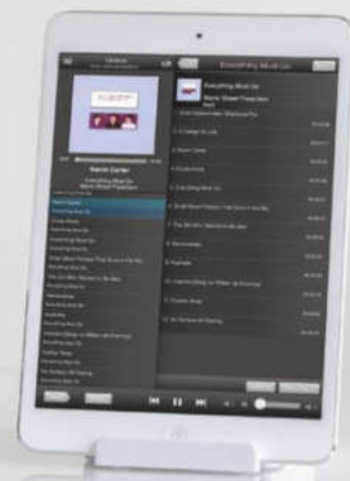


4 How do you combine today's large-screen TVs with beautiful views of the Sunshine Coast hinterland? **DIGITAL RESIDENCE** shows how with CEDIA's winner for Integrated Home Level One, with TV risers which required re-engineering of floor supports to drop TVs not only out of sight, but below floor level in some cases, while Stealth Acoustic speakers kept the audio similarly discreet. Lighting, security, access, HVAC, entertainment and more are all integrated under RTI control. www.digitalresidence.com.au

6 It wouldn't be the CEDIA Awards without a jaw-dropping marine installation from **LIQUID AUTOMATION** — this 43.9 metre (144ft) superyacht (right) boasts nine zones of distributed AV entertainment, three more zones of audio only, and three navigation stations, all impeccably delivered despite the challenges of a marine environment. Pics by Chris Lewis. www.liquidautomation.com.au



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5 ELECTRONIC LIVING won the Integrated Home Level Two category — traditionally the big award of the night, recognising a smart home that brings together not only distributed entertainment but also lighting, security, IT networking, energy management and more, here all under an intuitive Savant control system. It's a stunning home with more than 10 zones of distributed audio and video, including a Pool Pavilion with a top-notch audio system that involved hiding four Dynaudio active speakers in custom-designed enclosures. A stunning winner. www.electronicliving.com.au



THE BIGGER PICTURE

4 ACOUSTIC SECRETS FOR THE ULTIMATE HOME THEATRE

If you're lucky, you live in a huge house in the middle of nowhere, the nearest neighbour barely visible on the horizon, and only sheep to complain when your home theatre is cranked up to 11. If you're less lucky, grandma in the unit upstairs bangs on the floor whenever you so much as pick up the remote control. Your options: keep it quiet, and have no fun; keep it loud and who cares about the neighbours; or **soundproof**.

Soundproofing has a remarkable effect on any media space, but whether it's your home theatre, recording studio or jam room, the challenge is not just to retain more of the desired sound, but also to block out exterior noises and enhance your sound experience.

What's that sound?

Everyone is becoming aware of the need for noise isolation and sonic privacy. Whether you're building a home theatre from scratch or renovating and converting one of your existing rooms, a thumping home theatre may produce up to 100dB+ of sound level, somewhere in between a school disco and a rock concert. A standard stud construction interior wall with plasterboard on both sides will cut levels by only 30-35dB, leaving your neighbours and loved ones with noise levels akin to living next to a freeway. Adding an extra layer of plasterboard is remarkably ineffective – perhaps only another couple of dB saved.

The other critical issue is external noise. Traffic, aircraft, neighbours, family members in other rooms, the toilet flushing – maybe barely noticed as ambient noise, but when they're gone, your noisefloor is lower, you

enjoy a higher dynamic range and you can hear more detail in your music and movie soundtracks.

Hear No Evil

Enter the first 2 secrets: Dynil and Dynapad. These solutions are from Dynamat, a U.S. manufactured range of solutions used globally for its sound, heat & vibration damping efficiency and distributed in Australia by Audioxtra. At only 2.5mm thick, Dynil is a water and oil resistant material which is easily fixed to stud walls, flooring substrates & various ceiling structures.



Dynil

For use on wall skins, the product is simply fixed to the stud frame prior to standard plasterboard application and you're left with a layer that can block up to 40dB. This can be applied to new constructions or restricted to a single wall face of refurbished spaces. Dynil complies with fire rating standards and is resistant to temperature extremes (-40° to 105°C). In floor or ceiling profiles, it can be spanned between rafters/joists and directly on top of or under particleboard or timber flooring.

Dynapad is equally efficient as a floor sound barrier and can also be installed above or below any sound or noise source. With the additional oil & water resistant thermo-acoustic foam layers, it is specifically designed for use under carpet and eliminates the need for underlay.

A sound performance

Another key area is the importance of boxing your speakers within the wall or ceiling. Most such speakers are simply bolted within

...everyone is becoming aware of the need for noise isolation & sonic privacy.

the ceiling or wall cavity, which means that they have no rigid enclosure from which to fire, resulting in unwanted vibrations running everywhere – including noise leakage into adjacent rooms, and providing no protection from dust, moisture and vermin. Asking for the best from an unboxed speaker is like nailing the drivers from your finest hi-fi loudspeakers to a fence paling and hoping they'll perform to their best.

Enter the last 2 secrets: Dynabox and En-Wall. The Dynabox is in effect a box enclosure, while the En-Wall uses the enclosed cavity (i.e. two facing walls) to create the enclosure in which various other acoustic components surround the speaker.

The in-ceiling Dynabox not only boxes your speaker, it can be fitted retrospectively, being made of a black flexible vinyl which can be 'scrunched up' sufficiently to fit through an existing hole and around an already installed speaker. It provides an acoustic enclosure, while also minimising both radiated noise transmission in unwanted directions, and conducted vibrations into the surrounding area.



Dynabox

Without a suitable enclosure, an in-wall or ceiling speaker will send almost half of its output backwards (where it will disperse both sideways and into adjacent rooms), losing both imaging focus and effective power.



Dynapad



INSTALLER PROFILE

Name: Patrick Elbayeh

1. What brought you into the industry?

I've worked with my passion for audio over the last 12 years. Initially with car audio and in the last 7 years I've specialised in home theatre.

2. Why do you use the Dynamat range of products?

Dynamat is the world's number 1 automotive sound deadening product and I'm a huge fan of the entire range of Dynamat architectural solutions. I know that they work superbly and the ease of installation is matched by no other product in the market.

3. What impact do Dynamat solutions have on your clients?

The difference and improvement in acoustic performance always impresses. In one project with over 14 zones, seeing our customer's reaction when he heard his speakers in a Dynabox made such an impression that he put Dyna-boxes throughout his entire home.

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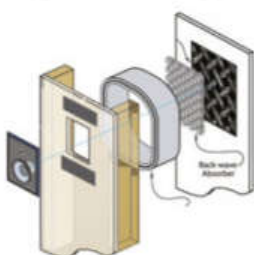
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DYNABOX



- Ceilings

En.wall



- Walls

In a nutshell

The Dynamat range of solutions allows use of standard construction techniques and keeps both cost and risk to a minimum. They work in both brand new construction projects or in retrofit/refurbish applications. No more complaints from the neighbours upstairs, downstairs or next door. They block out unwanted noise and will make your audio system sound like it cost you twice as much as it really did, allowing you to extract every nuance of detail available from your hi-fi or home theatre equipment.

Meet the family

Dynil is a dense, ultra-pliable sound barrier that prevents noise transmission through walls, floors and ceilings. Dynil's Mylar facing resists tears and allows for quick installation with standard construction staples or screws. With its high STC rating, Dynil reduces noise transmission over a broad frequency range.

Dynapad is a four layer composite sound barrier incorporating a polyurethane skin, 2 acoustic foam layers and a central Dynil layer. Dynapad dramatically reduces sound transmission through floors and is designed to be easily installed under carpet.

Dynabox is a revolutionary acoustic enclosure for ceiling mounted speakers. DynaBox is made from a flexible sound barrier vinyl and an innovative acoustic decoupler called the SoundSnake. DynaBox is ultraflexible which enables it to be completely collapsed for installation. This unique design makes the DynaBox extremely easy to retrofit through existing speaker openings or install in new construction projects.

Enwall is a speaker enclosure system which dampens, diffuses and decouples rear sound waves generated by wall mounted speakers.



www.dynamat.com

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AUSTRALIAN MADE SUBWOOFERS HAVE REACHED A NEW LOW

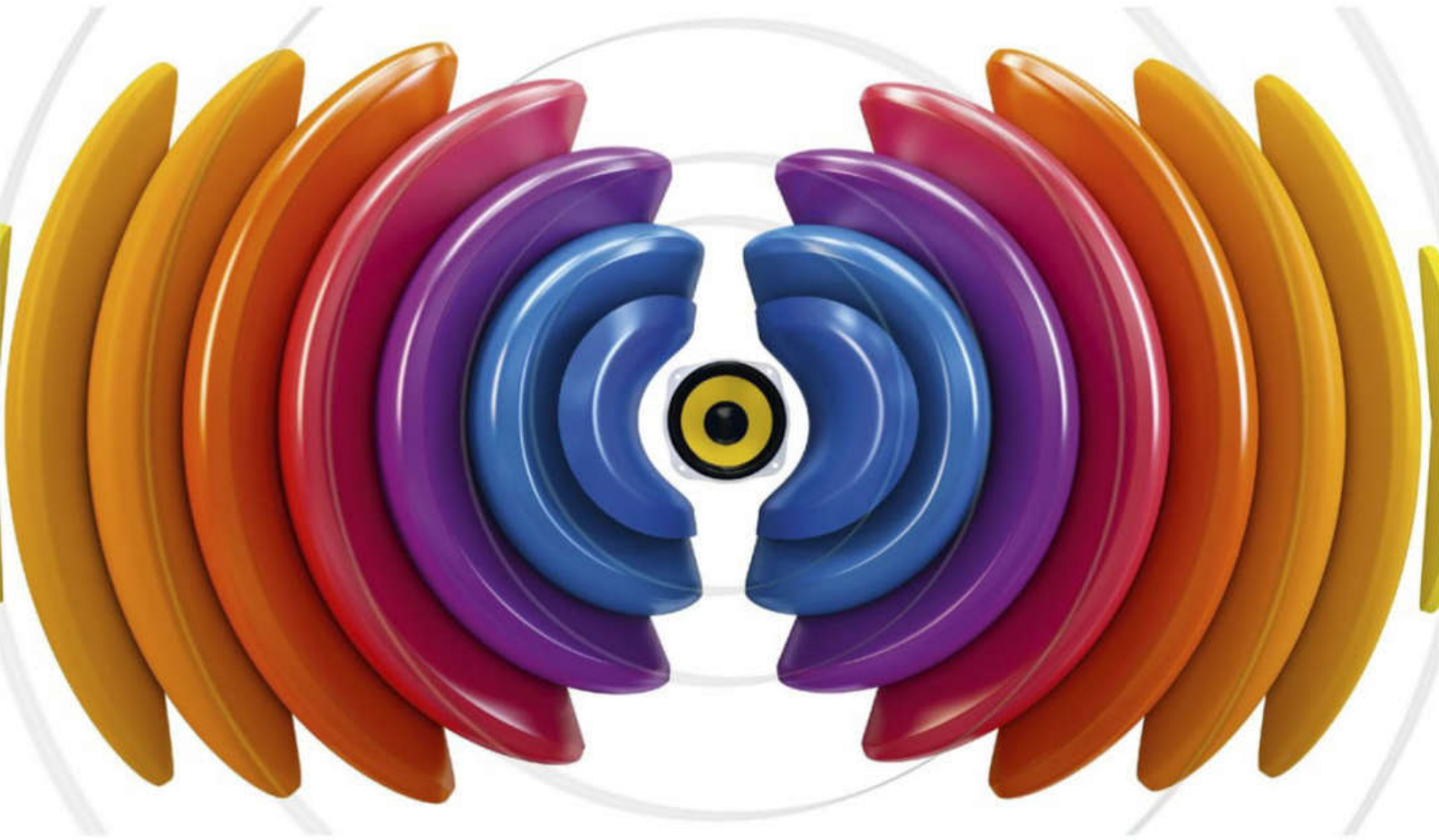
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All about that BASS

You want bass? Not woofy fake bass, but real tight deep stuff? You can't fake it — you need a subwoofer... and they're not just for the movies. Our group test of 13 subs rises upwards from \$999 — to see how low you need to go.

First off, let's dispel a misconception — that subwoofers are just for movie systems. For sure, the wizards of sound design behind blockbuster soundtracks use the lowest of frequencies to superb effect, heightening reality, inserting ominence, humming your tum-tum with a thrilling bass swoop as the articulated truck flies over the Ninja Turtle, or whatever.

But bass is not just for the movies. If you've had the chance to sit in front of a truly great (and large) pair of stereo speakers, perhaps at an audio show, you'll know how much the lowest of frequencies can complete the experience of musical realism, whether you're down in the thirties of hertz for a crunchy Neil Young guitar piece, or right down for that 16Hz fundamental pipe organ note from Bach's Passacaglia and Fugue in C minor, of which our reviewer Stephen Dawson (and his neighbours) is so fond.



“Something remarkable can happen when a large subwoofer is added to floorstanding speakers to play music...”

add an extra octave or two of capability down low — and if a high-pass filter takes some of the work away from your main speakers, things can sound thrillingly complete; you know it when you hear it.

So here we are examining all these subwoofers with a view to both movies and music. You can see precisely what we’re looking for in the panel on the right, where Stephen also apologises to his neighbours for playing the cannon fire from the 1812 quite so many times during the preparation of this issue.

Careful set-up is, unfortunately crucial with a subwoofer — not only are bass frequencies the main culprits when it comes to sonic anomalies in listening rooms, but that crossover zone is notoriously difficult to get right. Happily new technology and the smartphone app have come to the rescue in recent years — where once a pricey Real Time Analyser was beyond the means of a proud subwoofer purchaser, now there’s an app for that. Greg Borrowman walks us through that smartphone tuning process in our subwoofer set-up feature on p60.

A note on measurements

For the tech-minded, the frequency response graphs shown with each review were obtained by, first, setting the output level on 30-60Hz bandwidth-limited pink noise to 80dB SPL at an average of one metre from the subwoofers’ cones, then recording wideband pink noise. The measurement microphone was placed close to the cone to minimise room effects, except where noted in the article. The SPL meter used for level setting was in the same position for each subwoofer.

For the 30Hz distortion measurement, a sine wave was set to output at a measured 90dB SPL using the same position as for frequency response.



What we’re looking for in a subwoofer...

How are your neighbours? Mine are wonderfully tolerant. They must be, given the past few weeks of thumping bass they have endured from my listening room as I’ve subjected a baker’s dozen of subwoofers to deep sine wave and pink noise test signals, to the cannon blasts from the famed 1978 Telarc ‘1812 Overture’, to the dinosaur stomps (with content approaching five hertz) from a DTS-CD demo disc, to the bass guitar on rock tracks played very loud, to a massive Chinese orchestral drum.

And, of course, to the end-of-the-world bass rumblings of the movie ‘Titan A.E.’; and the shockingly realistic scream of aircraft taxiing way too close to the microphone in ‘Heat’, and to the impressive LFE tracks in a random selection of Blu-ray movies and TV shows.

All that, and not one complaint, in my quest to try to find the perfect subwoofer.

So what would you expect from the perfect subwoofer? Here I may differ from some ideals. THX, for example, considers -6dB at 20Hz to be more ideal than flat at 20Hz. I don’t. So this is what I would want in a subwoofer.

- Zero distortion.
- A flat response from at least 120Hz down to 2Hz.
- Output levels of up to 120dB in a large room at all frequencies.
- Fast, accurate timing with no phase shift across the frequency range.
- Compatibility with other equipment and, of course, with the room itself.

What, ‘2Hz!’ you’re saying to yourself? Well, yes: the Dolby Digital LFE channel is specified to carry from 2 to 120Hz.

Of course, this is the real world and you won’t get anywhere close to that without the application of tens or perhaps hundreds of thousands of dollars. So what I happily settle for in a subwoofer is the following.

- Distortion levels low enough to not be obvious.
- A fairly even output from at least 120Hz down to 20Hz, and preferably 15Hz or so.
- Output levels sufficiently high to cause physically pulsating air in the room at low frequencies.
- Fast, accurate timing that permits tuneful integration with the main speakers.
- Compatibility with other equipment and, of course, the room itself.

So that’s what I had in mind as I studied these 13 mighty subwoofers. **Stephen Dawson**

Can subwoofers augment a pair of small speakers to turn them into big ones in sonic terms? Well yes — Tomlinson Holman (for whom THX may have been named... possibly it was George Lucas’ movie ‘THX 1138’) argues that subwoofers with small main speakers are actually *better* than large speakers. As he notes, the subwoofer’s room position can be optimised for best bass performance, while the smaller speakers can be placed for best imaging and the like. There are many small satellite speaker designs which are delivered with a matching subwoofer aiming to achieve just that.

But perhaps ironically, the larger the subwoofer and the smaller the satellites, the less likely they are to work well together — the required frequency at which the handover happens may be too high for a large subwoofer to integrate smoothly. So a smaller subwoofer may be a better bet to go with small satellites.

But something remarkable can happen when a large subwoofer is added to floorstanding speakers to play music. It can



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A 'pretty little thing', the S.5 is available in gloss black and gloss white finishes, raised on silvery legs with an illuminated Sumiko top logo.

Sumiko S.5

Our first subwoofer comes from a new range, combining design style and a useful level of performance at a pretty friendly price.

SUMMARY

Sumiko S.5
subwoofer
Price: \$999

+ Very good value for money
+ Fine musical performance
+ Useful connectivity options

- High 3rd/2nd harmonic distortion
- Not effective for deep bass

The Sumiko S.5 really quite surprised us. A new brand, it is associated with the high-end Italian Sonus faber marque — though the Australian distributor clarified to us that although “part of the Fine Sounds Group group, it is not strictly speaking part of Sonus faber, although they do share some of the development team”. Still, Sumiko’s own subwoofer website pronounces them “a new product series by Sonus faber”, so we can remain surprised that the recommended retail price of this 8-inch subwoofer is a reasonably modest \$999. And it is a pretty little thing,

finished in a beautiful piano gloss, the shiny black cube (white is also available) held up from the floor by a four silvery legs, with Sumiko’s spiral logo illuminated on top.

The 210mm driver is mounted in the base of the unit, firing downwards. The feet give a clearance of around 50mm. The enclosure is sealed. There are 150 watts behind the driver. Unusually, these days, the amp is Class A/B rather than some digital thing.

Also unusual are the connection arrangements. There are three inputs, all mono, and no outputs. One input is LFE and this bypasses the low-pass filter. The next is line-level and this is, of course, under the influence of the filter control. There’s also a speaker-level input in the form of a Neutrik SpeakOn connection. The unit is supplied with a 10-metre cable terminated with a matching plug at one end and bare wires at the other for connection to speaker outputs on an amplifier. This also runs through the low-pass filter.

If you’re using the line input you will need to use an RCA line splitter. You should check that this won’t end up turning your stereo system mono. The speaker connection provides two active and one return wire. A high-input impedance from this should leave the speaker signal unaffected.

There are two level controls: one for the LFE input, the other for the two other inputs, so they can be set independently. A polarity reversal switch is provided.

A trick: if your receiver doesn’t handle bass well — perhaps fails to feed the bass diverted from small speakers at the correct level into the subwoofer output — then you can use a dual connection to the subwoofer. Set the receiver to ‘Large’ for your front left and right speakers, and feed those channels to the subwoofer from the speaker outlets. Also connect the LFE. Then you can balance the bass between the two sources to the subwoofer using the two level controls.

“an ideal choice for coupling with high-quality satellites or small bookshelf speakers”

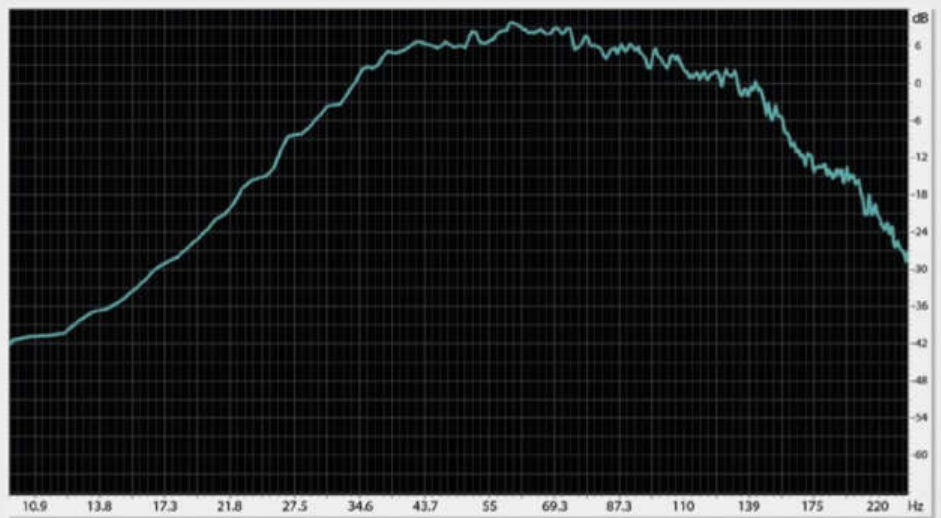
Performance

As usual, I installed the subwoofer in the test corner — you typically get a six-decibel output boost in a corner location — set the receiver's crossover to 80Hz and balanced the level. The Sumiko S.5 proved a lively little subwoofer, delivering punchy and effective mid-bass, extending into the upper reaches of the deep bass. It nicely covered the range required for full delivery of a kick drum and bass, both acoustic and electric.

In handling this music it was controlled and precise, avoiding any sense of lumpiness or monotonicity. The volume levels were more than adequate, even for my large-sized lounge room.

What was missing was much in the way of a real deep underpinning to music. The large orchestral drums on Telarc orchestral recordings were delivered with a reasonably satisfying

Measurements



The Sumiko's size precludes infrasonics, but output was impressively even from around 38Hz up to around 100Hz.

The form of the frequency response graph showed that the unit was delivering very even output from around 38Hz to above 100Hz, and that clearly exceeds Sumiko's modest claim of -3dB at 40Hz. From 38Hz, the output descended reasonably quickly to be down by 28dB at 20Hz. The measured ± 6 dB response was 33Hz to 143Hz. In a tighter envelope (± 3 dB) the unit delivered 37.5Hz to 108Hz.

I had already settled on 30Hz as the test frequency for distortion measurements before coming to this subwoofer, but since this was slightly outside the effective operational band on offer here, it was somewhat unfair. In order to achieve the 90dB level the volume control had to be bumped up by a little over 6dB compared to the others. The results appeared in a visibly distorted

waveform and a third harmonic of over 10% (the second was actually pretty good, as it happens, at a little under 2%). So to give a more representative figure, I re-measured at 40Hz (same criteria: 90dB SPL at one metre). The figures for the 2nd through 5th harmonics were 5.3%, 2.1%, 0.06% and 0.22%. Better, even though the second harmonic is on the high side.

thud, but without that sense of deep, powerful energy such drums are intended to provide. There were no infrasonics of course. Likewise, while the frequent deep bass lines in Wendy Carlos' 'Switched On Bach' were largely satisfying to the ear, they lacked the truly deep grunt that bigger subs can deliver.

For movies the subwoofer did a generally good job covering the bulk of LFE content, but again of course missing out on the really deep rumbling. Actually, to be more specific, there was a trade-off. At moderate volume levels (that is, levels which were room filling, while still well below reference level) there was a good sense of deep bass, and with bass impacts the unit maintained excellent control and composure. The thump of explosions were suitably powerful for a quite exciting performance.

The only real limitation was running extreme material at extremely high levels. For example, a test DTS-CD with some ridiculously deep and power infrasonic stuff seemed to have even its higher frequency bass sketched out rather than fully realised.

Conclusion

The Sumiko S5 would seem to be an ideal choice for coupling with high-quality satellites or small bookshelf speakers, and should prove well worth the money for anyone in that market. And its sense of style, no doubt inserted by those enthusiastic Italians at Sonus faber, is certainly a bonus. *SD*

1 Sumiko and Fine Sounds Group

Sumiko is best known as a major North American distributor, part of the Fine Sounds Group which includes Sonus faber, Audio Research and McIntosh. But Sumiko also has its own line of phono cartridges, and now subwoofers.



SPECS

Sumiko S.5

\$999

Drivers: 1 x 210mm, downwards firing

Enclosure: Sealed

Inputs: 1 x mono line input, 1 x LFE, 1 x mono speaker level input (SpeakOn)

Outputs: Nil

Low-pass crossover: 30-120Hz

Quoted power: 150 watts

Measured room response (pink noise -6dB): 33-146Hz

Level at 20Hz: -28dB

Dimensions: 335 x 285 x 315mm

Weight: 14kg

Warranty: Two years

Contact: Synergy Audio Visual

Telephone: 03 9459 7474

Web: www.synergyaudio.com

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Classic subwoofer design from Australia's Krix, shown here in black vinyl but also available in premium finishes including custom colours to match your décor.

Krix Seismix 3 v6.0

From South Australia comes this latest edition of the Krix Seismix 3 subwoofer. Version 5 won one of our 2010 awards — does the latest iteration deliver similar depths?

SUMMARY

Krix Seismix 3 v.6.0
subwoofer
Price: \$1095

- + Good musical performance
- + Solid LFE performance
- + Good value for money

- No effective output at 20Hz

In our introduction to this group test, we noted how 'conventional' designs are generally called so for a reason — namely that they work. For subwoofers, that's a large driver and bass reflex port on the front, connections on the back, plenty of power, and preferably the largest enclosure possible — the larger the enclosure and driver, the easier time it has of producing the sweet deep tones, and consequently the lower the distortion.

South Australian loudspeaker maker Krix has done just that with the Seismix 3 (officially in its version 6.0), one of the lowest-cost units in this round-up. The enclosure is a solidly-built and good-sized box weighing

over 15kg. The built-in amplifier packs 300W of power.

The 275mm driver — an unusual 11 inches — is located towards the bottom right of the baffle. That makes room at the top left for a very large bass reflex port. So no worries with placement here, especially as the Class-D amplifier generates relatively little heat. There are no heatsinks at the rear needing airflow.

The review unit was finished in black ash-look vinyl, as pictured, which is what you get for \$1095. If it will be tucked away, largely invisible, in a room corner then that makes for great value. But if you need it to be prettier you can choose from a real Black Ash, Cola or Ironwood veneer for \$1245, Atlantic Jarrah or Blackwood for \$1365, or a custom finish for \$1545.

A fairly basic set of connections were provided on the rear: left and right inputs (you use the right one for the LFE output of a home theatre receiver) and left and right outputs. These last are labelled 'Loop Through', and they are just as the name implies: they pass on the input signal without any filtering.

A switch allows you to choose between auto on/off (via signal detection) and always on. There's a level control of course, plus a low-pass filter control, with markings from 50 to 200Hz. The top setting is also labelled 'Bypass', but this doesn't actually take the crossover out of circuit, it simply marks the best spot to set the control when connected to an LFE output. The phase adjustment switch provides, unusually, a continuously variable adjustment from 0 to 180 degrees, rather than just switching between the two. Since a phase adjustment in degrees is necessarily frequency dependent, this marking is a convention — it actually acts as a group delay, and by its continuous nature provides increased flexibility in matching the subwoofer with the main speakers.

“It went very loud, very cleanly, particularly above around 30Hz...”

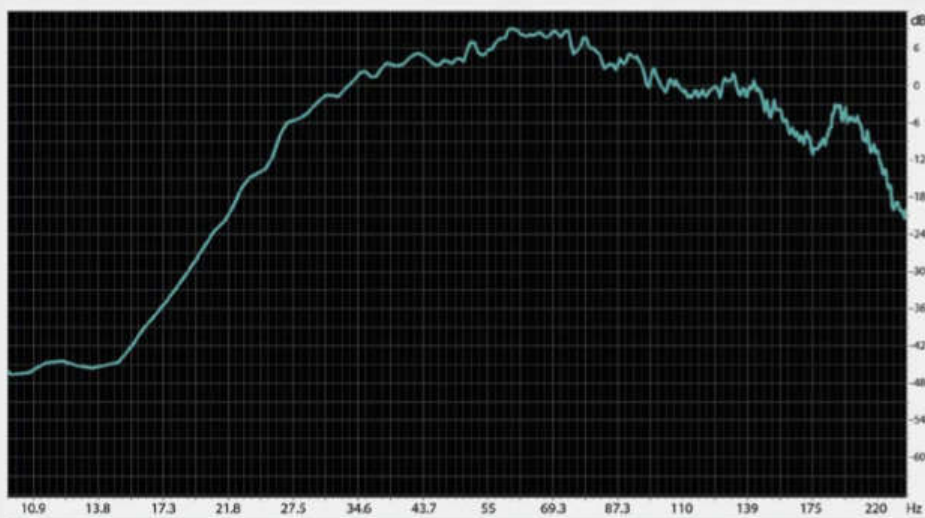
Performance

First things first — after plugging the subwoofer in, switching it on, running it for a while and balancing it up with the rest of the system, I stuck my head into the corner right above it while nothing was playing. And was greeted by perfect silence. There was no hum at all, which is what you’d expect from a Krix subwoofer, designed by people who live in a 50Hz nation. Other subwoofers in this group weren’t so quiet.

Then it was on to music. Playing my favourite recording of Bach’s ‘Passacaglia and Fugue in C minor’ (a recording by Telarc of a massive pipe organ in which the bottom C pedal has a fundamental of 16Hz), I was impressed by the ability of the Seismix 3 to excite the room when that pedal was hit at the end of each phrase. Which reinforces the fact that in the real world, acoustic instruments also have trouble really plumbing the depths. What the subwoofer was reproducing — what all of them do, really — was the second harmonic of this pedal’s pipes, and above, and it’s that 32Hz that does most of the room shaking.



Measurements



The rapid drop-off of a bass-reflex design is clear below 30Hz, but response was solid and extended above that.

In our listening room, in subwoofer corner, measured close, the Krix Seismix 3 v.6 delivered an honest 29Hz to 153Hz. As is typical with bass reflex designs, once the limit of bass extension is reached, the drop-off is precipitous. In this case the output was down by 30dB at 20Hz (that is, making no

practical contribution to the sound). At 30Hz and 90dB SPL at one metre, the second harmonic distortion was a reasonable 3%, while the potentially more objectionable third harmonic was just over 0.5%. Higher-order components were much lower.

But not all. As the Passacaglia section came to its climax, the missing 16Hz did reduce the sense of spacious awe that my usual subwoofer generates. But, then, no subwoofer in

this price category can go that low.

The bass guitar on Jeff Beck’s ‘Beck-Ola’ was full, clear and tuneful. Likewise on Oregon’s ‘Leather Cats’, although on this one there was some variability in level, tied to the notes being played. The kick drum was delivered with good clean slam, and no sense of harmonic distortion being added by the unit. This is a tuneful sub.

The unit did do a nice job with movie explosions. It went very loud, very cleanly, particularly above around 30Hz. But there were no infrasonics of note, and no real sense of pulsating air. Nor would you expect them at this price.

Conclusion

The Krix Seismix 3 v.6.0 subwoofer offers a larger driver than is usual in this price category, while maintaining this model’s heritage of providing a rock solid design providing good midrange performance — and at a very reasonable price. *SD*



1 Continuous phase control

A continuously variable phase adjustment (from 0 to 180 degrees, rather than just switching between the two) acts as a group delay, providing increased flexibility in matching the subwoofer with your main speakers.

2 Ins and outs

The basic connections are left and right line-level inputs (you use the right one for an LFE input) looped through unfiltered to the outputs.

SPECS

Krix Seismix 3 v.6.0

\$1095

Drivers: 1 x 275mm, forwards firing

Enclosure: Bass reflex

Inputs: 1 x stereo line level

Outputs: 1 x stereo line level

Low-pass crossover: 50-200Hz

Quoted power: 300 watts

Measured room response (pink noise -6dB): 29-153Hz

Level at 20Hz: -30dB

Dimensions: 450 x 360 x 410mm

Weight: 15.65kg

Warranty: 5 years (1 year for amplifier)

Contact: Krix Loudspeakers

Telephone: 1300 005 749

Web: www.krix.com.au

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A compact package with a larger than expected driver and amplifier in a sealed enclosure — the Dynaudio SUB 250 produced an underpinning with impressive depth.

Dynaudio SUB 250 II

Usefully compact yet still reaching down low for one so small, the first of two Dynaudio subs in this group delivered unusual but enjoyable results.

SUMMARY

Dynaudio SUB 250 II
subwoofer
Price: \$1399

- + Wonderfully compact
- + Good musical performance even when very loud
- + Respectable LFE performance
- Fairly high 3rd harmonic distortion
- No effective output at 20Hz

The way to make the best subwoofer is to put a large driver in a large (preferably sealed) box with a large amplifier. This, of course, may not work well for many homes. But what happens if you put a mid-sized driver and a mid-sized amplifier into a tiny (actually sealed) box?

That's what Dynaudio has done with the SUB 250 II. The results, it turns out, are entirely out of proportion to the size of the box.

By a tiny box, I mean less than one cubic foot in old talk, or less than 300mm on two sides, just over on the other. On its face Dynaudio has placed a 240mm long-throw driver. The voice coil is an unusually large

100mm in diameter, and a 200W amplifier is used to drive it. The grille is secured with magnets. The review unit had a 'Rosewood' finish, though the Satin White is pictured here, while Walnut, Black Ash, and Satin Black finishes are also available.

Did I mention that this is one very small subwoofer? It seemed almost insignificant sitting there in the subwoofer corner of my listening room.

The SUB 250 II has stereo line-level inputs under the control of a low-pass filter circuit, plus a separate mono LFE input (which, of course, is not subject to the filter). The stereo inputs are matched by stereo outputs for on-forwarding the signal to an amplifier for the main speakers in a stereo system. A three-position switch allows this signal to be identical to the input, or high-pass filtered at 60 or 80Hz, which makes it particularly suited to this kind of role.

The LFE input has a matching 'Slave' output. This just passes on the signal to any additional subwoofers. There's a switch for choosing whether the particular subwoofer is receiving the signal directly from the receiver or being slaved. The purpose of this is a little unclear — perhaps some kind of control signals are passed down.

Performance

When I first connected the SUB 250 and turned it on, it was way too loud — I hadn't yet balanced up the subwoofer with the main speakers, and I'd set the crossover on the AV receiver to 250Hz rather than the usual 80Hz. And the music I'd put on was the first track of the UB40 album 'Signing Off', which in keeping with the reggae style has a very strong, very active bass guitar.

But despite being way too loud, it sounded tuneful and clean, when it ought to have been overblown and imprecise.

“the proper solid bass underpinning that such movies need, albeit without the real deep-down grunt...”

The only real problem was that the bass was disconnected from the main speaker, with the high crossover providing too many audible clues as to the subwoofer's physical location.

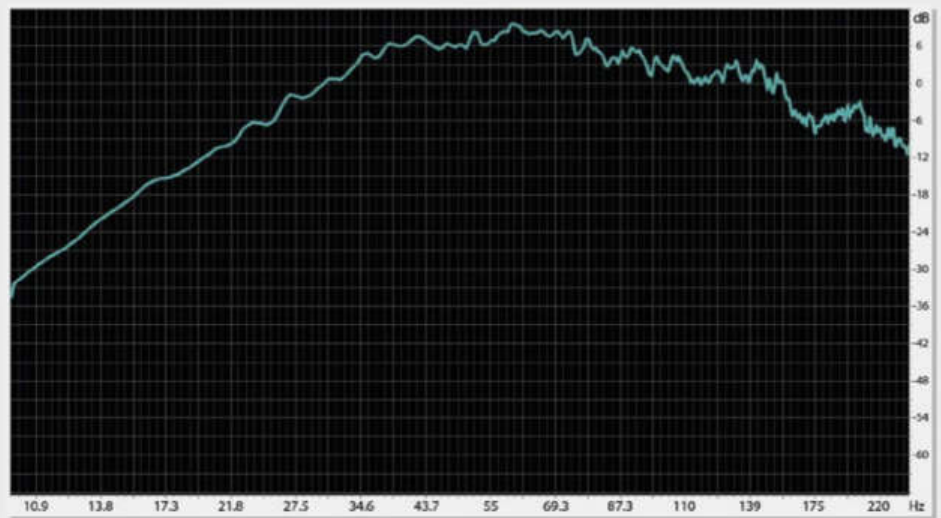
Balancing it up and putting the crossover at 80Hz fixed that, and the result was a strong bass performance, albeit with a slight emphasis on some notes rather than others, suggesting a peak in output in the mid-bass region.

I was interested in what such a small subwoofer would do with some really super deep material. So I hauled out a DTS-CD from Telarc with a track called 'Jurassic Lunch', which features some ridiculously high level infrasonic dinosaur footsteps. I removed the grille so that I could see what was happening, and it turned out to be a lot. Especially when I wound the volume up to an indicated 0dB on the receiver (I normally enjoy movies — loudly — at less than -10dB). The cone was vibrating furiously,

jumping in and out an enormous amount, while not producing any actual infrasonic sound. Impressively, despite its antics it didn't once bottom out.

Used more sensibly, it did a subjectively good job on the LFE content on the several movies I tried it on, giving the proper solid bass underpinning that such movies need, albeit without the real deep-down grunt that the larger units managed to provide.

Measurements



Exhibiting the slower roll-off of a sealed enclosure, this Dynaudio achieved 27Hz within -6dB of reference level.

Several of the subwoofers in this collection seemed incapable of reaching their specified bottom end in my room. This subwoofer sniffed at the challenge and reached the claimed 29Hz easily. Within my measurement envelope of ± 6 dB, the Dynaudio SUB 250 II actually reached an impressive 27Hz. But in a somewhat different style. It stretched out to a touch under 40Hz evenly, and then fell away at a shallower slope than many of the others, a feature of a sealed enclosure. Even

though the subwoofer was still producing a useful output at around 27Hz, the early start to the roll-off meant that the overall bass solidity was a touch limited.

Little boxes mean more work and stresses on the driver, which can introduce higher levels of distortion. Here the second harmonic distortion at 30Hz (90dB SPL at 1 metre) was fairly high at 3.35%, while the third was even higher at 5%. But the higher orders were much lower.

On a technical note, the way

the recording of this 30Hz tone was reproduced by this subwoofer was interesting. Instead of being clearly a symmetrical sine wave to the eye, the peaks and troughs were both achieved slightly later than normal, warping the waveform slightly. It was as though reaching each peak of an excursion was delayed slightly as the subwoofer's 'engine' fought the compression/rarefaction of the air in the small enclosure, and then accelerated with relief as the cone headed back towards the place of rest.

Conclusion

Reasonably priced, with good output levels and a fine music performance even when playing loud, the Dynaudio SUB 250 II is a subwoofer for those who want a very compact unit visually and for easy positioning, but who still require good performance. *SD*



1 Ins and outs

Stereo line-level inputs are under the control of a low-pass filter circuit, with stereo outputs for the main speakers with a three-position switch serving this up as identical to the input, or high-pass filtered at 60 or 80Hz.

2 LFE and slave output

A separate mono LFE input has a matching 'Slave' output, with a switch for choosing whether the original signal is directly from the receiver or as a slave from another subwoofer.

SPECS

Dynaudio SUB 250 II \$1399

Drivers: 1 x 240mm, forwards firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 1 x LFE

Outputs: 1 x stereo high pass, 1 x LFE pass through

Low-pass crossover: 50-150Hz

Quoted power: 200 watts

Measured room response (pink noise -6dB): 27-158Hz

Level at 20Hz: -16dB

Dimensions: 271 x 266 x 308mm

Weight: 7.2kg

Warranty: Three years

Contact: BusiSoft AV

Telephone: 03 9810 2900

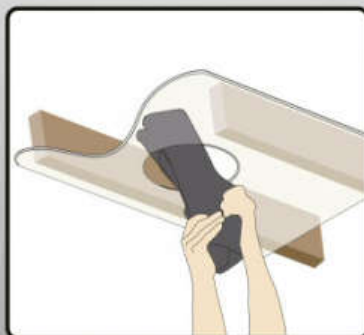
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Standing slightly taller than its footprint in a neat black satin finish, the M&K Sound sealed-box subwoofer produced bass reminiscent of the low frequencies from a pair of bass-competent floorstanders.

M&K Sound V8

By limiting the output performance of this subwoofer to the realms where it works best, M&K Sound has delivered a nicely musical subwoofer at an effective price.

SUMMARY

M&K Sound V8
subwoofer
Price \$1499

+ Pleasing musical performance
+ Good levels with LFE operation
+ Compact design

- High distortion levels
- Not effective at 20Hz

If you have always thought M&K Sound to be a US firm, you might be as surprised as we were to see the back of the M&K Sound V8 subwoofer proclaiming the firm to be Danish. Turns out that the old M&K closed in 2007 and reopened in Denmark under new ownership in 2008, bringing in some of the previous team.

This M&K V8 is the entry-level model for the company's subwoofer range. It features a 203mm (eight-inch, as the name suggests) forwards-facing driver in a compact enclosure. It adopts a nice, compact, traditional design. The enclosure is sealed.

The driver includes some features from the company's higher level X series, including shorting rings

(as the cone nears the end of its range of travel, one or other ring enters the magnetic field and sets up a magnetic force opposing further travel, providing a 'soft landing'). The pole piece is also machined to permit greater travel.

The V8 stands 340mm high, and is otherwise less than 300mm in its dimensions. The review unit was finished in black satin, and satin white is also available. It is supplied with stick-on feet, and a glove so you can handle the unit without leaving finger marks.

The unit has a simple line-level stereo input. For LFE, you just plug into the 'Left' input and then set the filter control to 'Bypass'.

There are also level and continuous phase controls. The latter is more a group delay control rather than for phase. Whether used in a stereo system or with the LFE output of a surround system, this can help integrate the sound from the main speakers with that of the subwoofer in the vicinity of the crossover frequency. Many modern home theatre receivers will take care of group delay on their own (by setting the distance) so in general it's best to leave this on '0' and then adjust after calibrating the system using the receiver's routines, and only if the bass around the crossover seems deficient.

There are also stereo outputs, with no indication that they are high-pass filtered, so they almost certainly aren't.

Performance

After balancing up the levels, the M&K V8 subwoofer delivered a relaxed performance with music — tuneful and fast, keeping excellent timing with the main speakers.

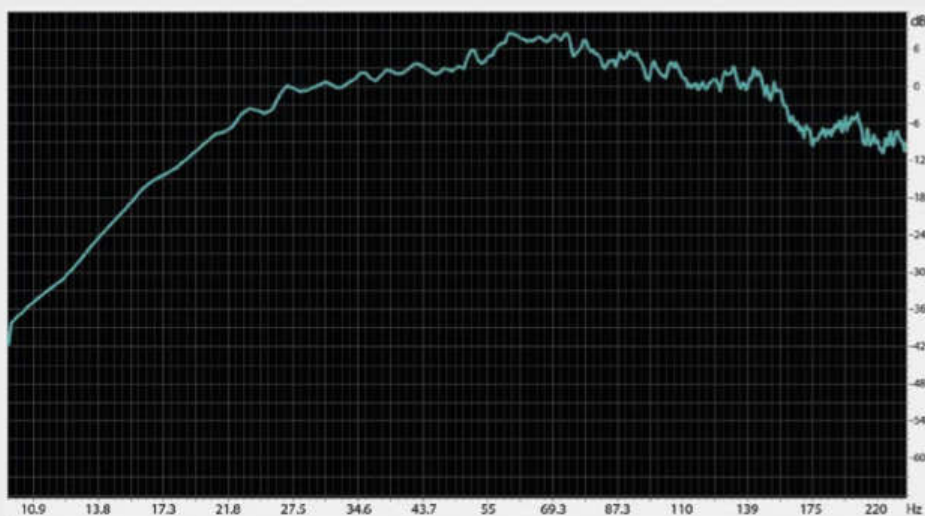
In fact, it sounded quite a lot like the bass produced by bass-competent floorstanding loudspeakers, rather than a subwoofer. That's because the deeper stuff seemed to be at a lower level than the mid-bass material. For example, the bass guitar in The Police's 'Tea in the Sahara' was tight and generally strong, but changed slightly in character in the

“a very enjoyable performance with music, if not ultimately a highly accurate one...”

lower notes, giving a great prominence to the harmonics rather than the fundamental frequency.

Likewise, on the original Telarc rendition of Tchaikovsky's 1812 Overture, the powerful bass drum strikes at around three minutes in resulted in a solid and loud thump, but without the overblown sense that subwoofers with an even delivery down to below 30Hz manage, and certainly without the reverberant bass aftermath that the best subwoofers can produce. When it came to the cannon, it only sketched the depths on offer when turned up loud, though it certainly coped without any damage. But as I wound the volume back while the music proceeded, the bass content of the cannon became more prominent in the mix. It was as though the subwoofer had limited its output to within its capabilities, and was therefore somewhat recessed in the mix at high levels, but well up to things with a reduced volume.

Measurements



The sealed box here delivers a gentle slope to the bass roll-off, though the eight-inch driver works hard down low.

The output of the subwoofer conformed to a kind of smooth upwards slope from 27Hz to 60Hz, rising about 8dB between those frequencies. Above that was a plateau for about 10Hz, and then a slope back downwards as the frequency continued to rise. Using my usual ± 6 dB envelope, the subwoofer proved rather capable, delivering from 25.6Hz to 158Hz. Thanks to the sealed box design, the below 27Hz roll-off was not as steep as some, so in

the end 20Hz was 11dB below the average output level.

The laws of physics aren't always kind. There's no reason why a small driver can't produce the same deep frequencies at the same levels as a large driver. However, physics demand that to do that it must move its cone further — the cone of the smaller driver undergoes a greater excursion than that of a larger driver. Greater excursions almost inevitably mean increased nonlinearities.

And so we come to the distortion measures. For 30Hz at a 90dB SPL level at one metre, the second harmonic distortion was 10.6%, while the third was 6.3%. Higher order distortion products were less than a third of a per cent.

I can't say that these results were obvious in listening, but do remember that because the sensitivity of the ear is rolling off substantially as frequency lowers, the higher harmonics are actually more audible than the raw figures suggest.

All that made for a very enjoyable performance with music, if not ultimately a highly accurate one.

The movie performance was similar in character: no infrasonics at all, but a good mid-bass thud and crash, and a reasonable lower bass rendition. It managed to nicely fill my listening space, which is a bit larger than a typical lounge room.

Conclusion

While distortion was apparently significant at the extremes, I rather enjoyed the M&K Sound V8 subwoofer. It's not for those wanting the greatest of depth, but if coupled with good satellites in a medium-sized room, it should make for a fine stereo and home theatre experience. *SD*



1 Ins and outs

The unit has a simple line-level stereo input. For LFE, you plug into the 'Left' input and set the filter control to 'Bypass'. There are also stereo outputs.

2 Controls

The M&K has volume, crossover and continuous phase controls. The phase is more a group delay control to integrate the sound from the main speakers with that of the subwoofer in the vicinity of the crossover frequency.

SPECS

M&K Sound V8

\$1499

Drivers: 1 x 203mm, forwards firing

Enclosure: Sealed

Inputs: 1 x stereo line level,

Outputs: 1 x stereo line level

Low-pass crossover: 60-150Hz

Quoted power: 150 watts

Measured room response (pink noise -6dB): 25.6-158Hz

Level at 20Hz: -11dB

Dimensions: 340 x 260 x 290mm

Weight: 10.3kg

Warranty: Three years

Contact: QualiFi

Telephone: 1800 24 24 26

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The grille shown here is optional, since this is a subwoofer not designed to be out on display.

So the Volcanix Slim is available only in a black vinyl finish, and at the basic price comes without the grille (pictured left — should you want the grille as well, the price goes up to \$2145).

This is a large subwoofer, but shaped so that it is tall and wide, but not very deep — indeed, just 295mm deep. The back is featureless, with the connections on the right side, so it can be pressed firmly back against a wall. The 305mm driver (able to deliver a cone excursion of 50mm) is in the front face. The twin bass reflex ports fire downwards, with the base of the unit held up by 35mm-tall rubber legs from the floor.

The unit is powered by an ICEpower digital amplifier which is rated at 450W, and it includes a soft clipping circuit to avoid damage.

Inputs are straightforward: there's a pair of line-level inputs, and a row of four speaker binding posts for high-level inputs. For LFE operation you just use the left-channel line-level input and set the crossover to 'bypass'. There's also 12-volt trigger input to allow other devices to switch the subwoofer on. There are no outputs.

All the controls are electronic, and are readily accessible from a small panel on the front, with four keys and an LCD display. This allows the setting of volume, phase (switchable between 0 and 180 degrees), crossover frequency (50 to 195Hz in 5Hz steps, with 'Bypass' at the highest setting), and sensitivity for auto switch on.

There was also something called 'High Pass Q' which could be adjusted. Since there are no outputs, there would seem to be little point in a high-pass filter. I suspect that the control module has additional capabilities, and this one was left unnecessarily enabled.

Performance

The shape of the subwoofer certainly facilitated tight corner placement, as it would wall placement if you prefer that. And again, Krix demonstrates

Krix Volcanix Slim

Part of Krix's 'SX' home theatre range, the Volcanix Slim is designed for unobtrusive or hidden appearance, while still delivering high-quality low frequencies.

SUMMARY

Krix Volcanix Slim
subwoofer
Price: \$1995

- + Very high levels available
- + Good musical performance
- + Good fit for certain installations

- No effective output at 20Hz

Krix's Volcanix Slim is a brand new subwoofer, released just in time for this group review, and it is unusual in a couple of ways. First, it is derived from an existing model, the Volcanix, but is presented with a different form factor for a slightly different purpose.

Which brings us to the second unusual aspect of it: rather than being part of Krix's standard home entertainment line-up (like the Volcanix earlier in this group), it's part of its SX home cinema range. The difference? The latter are orientated more to hardcore home cinemas in which the loudspeakers are hidden, or at least unobtrusive.

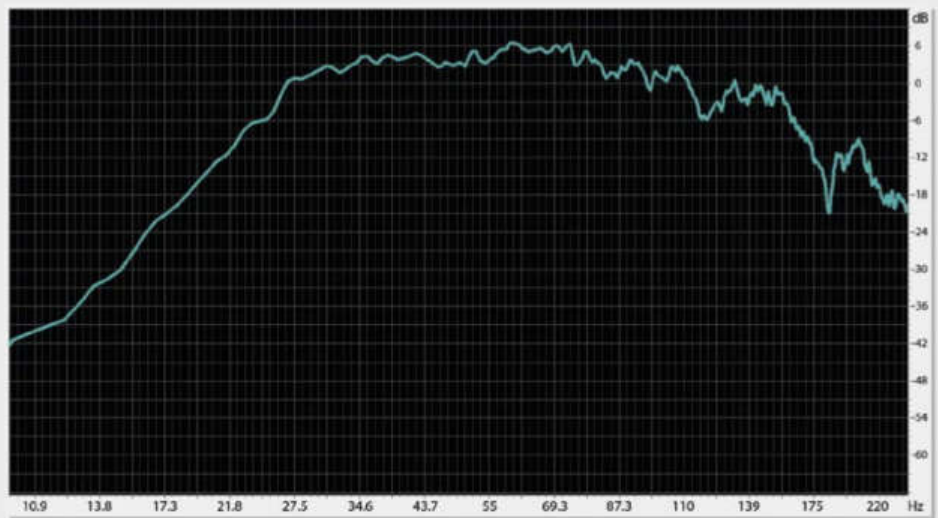
“the best fit for a certain range of installations, rather than regular room placement”

that a subwoofer designed in Australia somehow manages to avoid producing any perceptible 50Hz hum.

Set-up was simple. The default volume setting of -20dB on the LCD panel fit it neatly in the adjustment range of the Denon AV receiver I was using. In short, there was no need to change any settings (it was already on bypass for the filter), so exceedingly simple indeed.

From the start it was immediately apparent that there was enormous power. The double bass on Holly Cole's 'Jersey Girl' was delivered with the full body of the instrument's casing in complete evidence. I was beginning to suspect that this might have actually been a touch overblown, until I switched over to 'Wrapped Around Your Finger' by The Police, and found the bass guitar here rather too well controlled, recessed even compared to my usual experience. The solution was one surprising to me: I used the phase control to flip the polarity from 0 to 180 degrees. Since in my set-up this

Measurements



Low distortion and bass down from 24Hz to 163Hz within -6dB makes this a versatile sub in use as well as positioning.

On measuring the output, I must admit to being surprised — the bass extension was not as great as I had expected from listening. The bass ports on the underside of the unit of course provided a boost in extension over the sound directly radiating from the front of the driver. Measured close to the base, there was a shoulder in the output at 27.5Hz, with the output descending rapidly

below that. It reached 24Hz within the ± 6 dB measurement envelope. At the upper end the output happily reached above 150Hz, so the sub can handle bass redirected from fairly small speakers as well as large ones.

There was another surprise: the excellent distortion performance. At the 30Hz test frequency the second harmonic was just 1.12%, and less than 0.3% for the third harmonic. All

higher order components were well under 0.1%.

I attempted to determine whether the phase had been reversed in the subwoofer (see main text), and this did not appear to be the case. I suspect that the very slimness of the unit changed the distances between its effective centre of sound emission and those of the main speakers to require the flip.

is just about never required, it was only as a last resort that I tried this. Anyway, for whatever reason this change solved that and brought the bass up in the crossover region (I had it set on 80Hz) to a fine, strong level.

Switching over to movies, it soon turned out that this subwoofer was not just for explosions and massive impacts, although it was fine with them too, it was also suitable for at least sketching dinosaur footsteps,

approaching almost infrasonically and powerfully entirely in the LFE channel.

Conclusion

The Krix Volcanix Slim subwoofer offers a strong audio performance, but in a package that makes it the best fit for a certain range of installations, rather than regular room placement. If that's your requirement, do check it out. *SD*



1 Electronic controls

All the controls on this Krix subwoofer are electronic, readily accessible from the small panel on the front, with four keys and an LCD display.

2 Connections

As this sub is designed for unobtrusive placement possibly hard up against walls, all the inputs are on the right-hand side and the subwoofer ports to the bottom.

SPECS

Krix Volcanix Slim

\$1995

Drivers: 1 x 305mm, forwards firing

Enclosure: Bass reflex

Inputs: 1 x stereo line level, 1 x stereo speaker level (4 x binding posts)

Outputs: Nil

Low-pass crossover: 50-195Hz

Quoted power: 450 watts

Measured room response (pink noise -6dB): 24-163Hz

Level at 20Hz: -15dB

Dimensions: 630 x 500 x 295mm

Weight: 24.3kg

Warranty: 5 years (1 year for amplifier)

Contact: Krix Loudspeakers

Telephone: 1300 005 749

Web: www.krix.com.au



The Velodyne is shown here with its grille off — once grilled it is a neat unit, and also brings the advantages of microphone calibration.

Velodyne SPL-1200 Ultra

Velodyne is a subwoofer specialist, and it shows in the powerful and extended performance here.

SUMMARY

**Velodyne
SPL-1200 Ultra**
subwoofer
Price: \$2899

+ Enormous levels available
+ Very low distortion
+ Very good bass extension

- No, nothing negative here

Velodyne is one of those few companies that makes subwoofers, plus some other stuff, rather than the other way around. So you'd expect its SPL-Ultra Series SPL-1200 Ultra subwoofer to be pretty good. (Spoiler: it is.)

This is a mid-sized unit, and fairly heavy at a bit over 20kg. The enclosure has a piano-black gloss finish and sides that taper slightly as they move towards the rear. The removable grille is cloth over a panel, which has cut-outs for the driver and for the IR receiver on the body (this subwoofer comes with a credit-card sized remote control). The top of the grille is also sculpted

to allow access to the soft power button (there's a hard switch at the rear), the calibration microphone input and the blue display.

The calibration microphone for that input is supplied, along with what is described as a 'mic stand'. Don't be confused, it's only 25mm tall. The microphone itself comes with a generous length of cable.

The sub's driver is a 305mm unit (the 12 inches of the model number) with 75mm voice coil, with coils wound both inside and outside the former. The magnet structure is a massive 9.8kg — nearly half the weight of the entire unit. The driver uses a die-cast aluminium basket.

Sealed enclosure, big magnet — all these things suggest a big power amplifier. Velodyne rates it at 1200W continuous and says that its digital amplifier technology runs at better than 95% efficiency. The signal is DSP-controlled, and the main control function is of course the 'room bass correction' circuit, which is adjusted using the calibration system. This features seven bands of adjustment.

There are line-level and speaker-level inputs. The adjustable filter has a setting at one end of its range by which it can be bypassed. There are also line-level outputs which are subject to a fixed 80Hz high-pass filter, so these are useful to pass on the signal to a power amplifier for the main speakers in a stereo system.

Phase is adjustable to four settings using the remote, and likewise the level can be set with the remote. The front display shows the chosen level. There are also four preset EQ curves which apply boost for different purposes.

Performance

Performing the calibration is very simple: you simply plug in the microphone and stick it where your head would normally be, then press and hold the EQ key on the remote control for a few seconds.

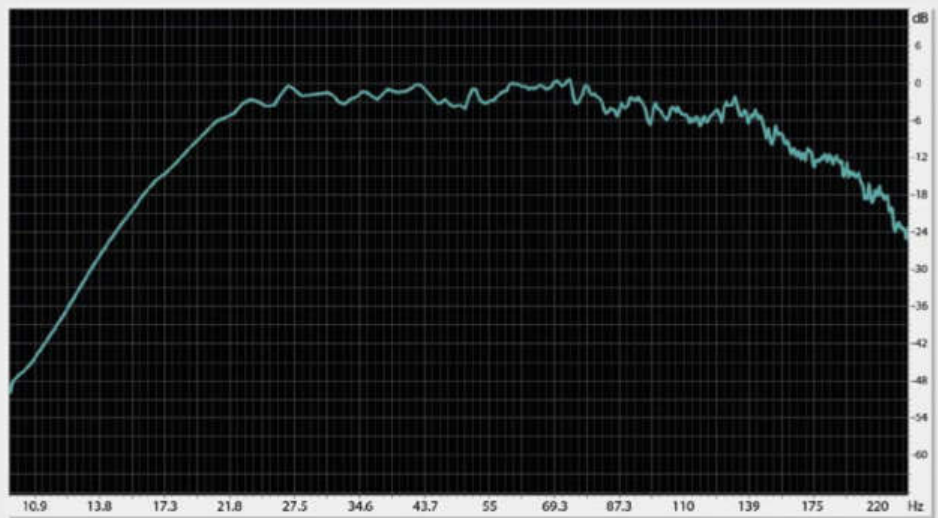
“extremely powerful, and with very good extension...”

The subwoofer will respond with about 10 rather loud frequency sweeps, and that's it. I tested it also in a position with a relatively lumpy bass response and the system pulled back the peaks by a couple of dB, but the effect was fairly mild. It doesn't seem to have been engineered for aggressive correction.

Listening soon revealed this to be a fine, fine subwoofer indeed, extremely powerful, and with very good extension. On music — The Police, 'Leather Cats' by Oregon, all the tracks on Holly Cole's 'Temptations' album — the subwoofer's bass was strong, but smooth and tuneful. I played several tracks way too loud for comfort, and the subwoofer just kept on doing its thing, only louder.

The big drum in the overture of 'Dagger Society' suite was thunderous, with superb bite on the stroke, room-rattling power and a deep, rumbling decay. The Bach, the Tchaikovsky, equally good. Again, temptation got the better of me. The main complaint about the venerable recording of the 1812 has been that one can't play the orchestra at enjoyable levels without destroying one's speakers when the cannon come

Measurements



Just a couple of decibels down at 20Hz, and impressive smooth up to 144Hz, the Velodyne measured (and sounded) great.

Measured up close, the bass output of this Velodyne proved to measure impressively smoothly, essentially being flat within ± 3 dB from 21.3 to 144Hz, and rolling off reasonably gently below that range. At 20Hz

it was down by only a bit over two decibels from the average of the useful output range. The overall ± 6 dB range was 18.5 to 167Hz. You won't find many subwoofers offering a wider range than that. The distortion

levels for this unit were reasonably low, too, running at 1.5% for the second harmonic, 0.35% for the third, and much lower for the fourth and beyond. In summary it measured as impressively as it sounded.

along. This subwoofer overcomes that problem. I enjoyed both the orchestra and the thorough slams when the time came.

Movie performance was just as good. The airport scene in 'Heat' and the end of the world in 'Titan A.E.' both positively pulsed the room.

The unit has a Night Mode for 'late night listening', and for a moment I was excited that this unit was going to address a weakness in just about every subwoofer: the inability to set a high-pass filter to eliminate the deep bass. It is that which travels the furthest at night. Unfortunately, this seems to act as a level limiter rather than a filter.

As for the presets: choose 'Jazz'. The graph presented here was with the subwoofer with that setting, and that's what I did all my listening with. The 'Rock', and even

more so the 'Games' presets produce peaky output in the mid-bass with reduced bass extension. The 'Movies' preset could be useful. It rolls off the bass fairly sharply below 30Hz — doing what I'd hoped Night Mode would — but you need to adjust the level because it's about 6dB higher in the mid-bass than 'Jazz'.

Conclusion

The Velodyne SPL-1200 Ultra is one of those rare subwoofers able to reconcile the often irreconcilable: deep bass extension, low distortion, high levels and reasonable enclosure size. This is one deeply impressive sub. *SD*



SPECS

Velodyne SPL-1200 Ultra \$2899

Drivers: 1 x 305mm, forwards firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 1 x stereo speaker level (4 x binding posts)

Outputs: 1 x stereo high pass

Low-pass crossover: 40-135Hz

Quoted power: 1200 watts

Measured room response (pink noise -6dB): 18.5-167Hz

Level at 20Hz: -2.5dB

Dimensions: 394 x 380 x 470mm

Weight: 20.7kg

Warranty: Two years

Contact: Revolution Technologies

Telephone: 07 3902 8051

Web: www.revolutiontechnologies.com.au



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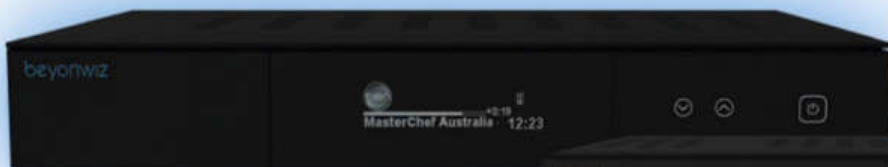
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The Sunfire proved impressively weighty not only when you lift it, but in its performance as well.

be 10-inch drivers on two sides, and a black piano gloss finish. A cube of water the same size as this subwoofer would weigh 26.5 kilograms. It weighs 24.8kg. Astonishing!

Anyway, it turns out that one of the drivers is a passive radiator. Pushing either cone firmly creates only the slightest movement. The suspension is incredibly heavy, so a hefty amplifier is required to make this move. But this is Sunfire, most famous for its high efficiency, high performance, tracking downconverter power supply amps. This one is rated at no less than 2700W.

The driver and the passive radiator are exposed. No grilles as such are provided, but a kind of surround is provided for each side which provides a little side-ways protection. Nonetheless, care should be taken around this subwoofer to avoid damage.

The unit comes with stereo line-level inputs, plus a balanced XLR LFE input. Regular LFE connections are made to one channel of the line-level input. There's a bypass setting on the low-pass filter control. There's also a slave input (and output) for daisy-chaining a series of subs. The stereo input is passed on to a stereo line-level output, which can be optionally high-pass filtered at 85Hz.

The usual controls are provided, but there's a little something extra: an automatic calibration system, complete with microphone. Some of the other subs discussed here have calibration system as well, but none is as simple as this: put the microphone at the listening position, plug it in, press the 'Start' button and wait for a couple of minutes. This tests and adjusts the levels at 35, 49, 64 and 84Hz. You can adjust using a fairly clunky manual system at the same test frequencies if you prefer, but given the results we got, we don't see why you'd bother.

Sunfire XTEQ10

Not only an impressive performer, but blessed with ease of use thanks to an effective auto-calibration system.

SUMMARY

Sunfire XTEQ10

subwoofer

Price: \$2999

- + Very high levels available
- + Excellent auto-calibration system
- + Extremely compact

- Not effective at 20Hz
- 2nd harmonic distortion a bit high

When the courier came, he noted that the Sunfire XTEQ10 subwoofer was startlingly heavy, even though the carton was fairly small. But this was misleading. It's actually *shockingly* heavy, especially once you get it out of the carton.

To do that, you slice open the top of the carton, open the four flaps. Inside you'll see another carton. Repeat. Another carton. Repeat. Another carton. Pull this out. It holds the accessories. Invert the three nested cartons carefully and lower the subwoofer. Remove the four cardboard-protected polystyrene corner pieces. Remove the plastic bag. Remove the cloth bag. There, it's done!

What you've revealed is a remarkably small cube, less than one cubic foot in volume, with what appear to

“authoritative, clean, fast and powerful, as though it was four times the size it actually was...”



Performance

As usual, I started my listening with the EQ turned off in order to see what the sub would manage in a kind of native mode. To be frank, it was really quite disappointing. The deep bass was very recessed compared to the upper bass, sapping the sound of any sense of authority. Rather than pursuing that, I ran the auto EQ process — which really was as easy as outlined.

That done, I tried listening again. And the subwoofer was an entirely different unit (see also our *Measurements* panel). It was balanced, authoritative, clean, fast and powerful. It also sounded as though it was four times the size it actually was. I kept having trouble believing that

Measurements



The power of auto-calibration — the Sunfire's response after EQ (blue) was far smoother than without it (orange).

As mentioned in the main article, the subwoofer was quite different with EQ switched off, and with the EQ automatically calibrated. In the former condition (orange line), the bass was flat and even between 27Hz and 50Hz, and then rose to a new plateau some 9dB higher commencing at 60Hz. No wonder the deep bass sounded weak. The auto EQ, though, changed that completely. When it was done (blue line), there was just one plateau, from just under 27Hz to 95Hz (± 2 dB).

This subwoofer produces virtually nothing in the way of infrasonics. Indeed, it looks like the DSP imposes a brick-wall filter around 26-27Hz. The output drops by 15dB well before 24Hz. There's a bump in the response around 20Hz, but it is still down around -17dB.

I think this is good design practice for a subwoofer this small. Trying to move the cones at lower frequencies means greater cone excursions, which at some point would tip over into obvious distortion

and possible bottoming out, plus require even more thousands of watts. This subwoofer works very well in the chosen frequency range.

You might expect a fair bit of distortion given the amount of work everything is required to do, pushing a big cone in a small enclosure. At my chosen 30Hz, though, the results were quite different. There was indeed a fair bit of 2nd harmonic — nearly 4% — but the third harmonic was only 0.4% and the higher orders at or below 0.05%.

this unit was delivering the levels it was doing. The mighty rumble of the jet airlines on the tarmac during the climax of 'Heat' (1995) pounded out. Virtually all musically important notes were reproduced, although some exotic components were missing, such as the 16Hz fundamental on my favourite Bach pipe organ piece. However the 32Hz component of this was wonderfully full and room filling.

Still, the really deep frequencies suggested by the specifications were clearly not evident.

One thing: the sub seemed slow to react to an input — it took eight seconds for the auto switch on.

Conclusion

The Sunfire XTEQ10 is an extraordinary device, with great performance from 27Hz and up, while the auto-calibration feature means that it can be readily optimised for just about all systems. *SD*



1 Control or calibration

The usual controls are provided, but the automatic calibration system (using a supplied microphone) proved so effective that you most likely won't need to do a manual set-up.

2 Ins and outs

There are stereo line-level inputs, passed on to stereo line-level outputs, which can be optionally high-pass filtered at 85Hz. Regular LFE connections are made to one input or to a balanced XLR input. There's also a slave input (and output) for daisy-chaining a series of subs.

SPECS

Sunfire XTEQ10

\$2999

Drivers: 1 x 245mm, sideways-firing

Enclosure: Passive 254mm radiator

Inputs: 1 x stereo line level, 1 x XLR LFE, 1 x Slave

Outputs: 1 x stereo high pass, 1 x Slave

Low-pass crossover: 30-100Hz

Quoted power: 2700 watts

Measured room response (pink noise -6dB): 25.6-119Hz

Level at 20Hz: -17dB

Dimensions: 290 x 315 x 290mm

Weight: 24.8kg

Warranty: Three years

Contact: QualiFi

Telephone: 1800 24 24 26

Web: www.qualifi.com.au

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The NS-SW1000 has its power switch and volume on the front, port on the side, and its 12-inch driver firing forwards.

Yamaha NS-SW1000

Yamaha's remarkably-heavy bass-reflex subwoofer proved a most musical performer with plenty of power across almost the whole bass spectrum.

SUMMARY

Yamaha NS-SW1000
subwoofer
Price: \$2999

- + Fine musical performance
- + Extremely powerful above 25 hertz
- + Solid LFE performance
- No effective output at 20 hertz

Yamaha's NS-SW1000 subwoofer is the kind of thing that defies preconceptions. For example, traditionally one might expect a Japanese subwoofer to be a rather lightweight affair. This one? Uh, no. The specifications say 42.6 kilograms, and out of respect for my back, I didn't try to get it onto the scales to check.

A heavy (astonishingly heavy) subwoofer speaks to its structure — strong panelling in the enclosure, hefty bracing, a well-built driver. In this case the enclosure is a bass reflex design with a large port on the right-hand side. This features a twisted flare to reduce turbulence.

In the front is a 300mm driver, hidden under what appears to be a fixed grille of cloth over a sturdy plastic grate. This clearly protects the driver cone well, but did

mean we couldn't measure the actual cone diameter. The cone is paper with Kevlar fibres, says Yamaha. The driver features dual magnets and a die-cast aluminium frame. It is driven by a 1000W digital amplifier.

It also features Yamaha Active Servo Technology II. Some subwoofer servo technologies work by placing an accelerometer on the cone and then using the signal from this to detect nonlinearities, which can then be at least partially corrected by the unit automatically tweaking the signal. Yamaha's system apparently relies on using a negative impedance converter to, in practice, provide a simulacrum of zero output impedance from the amp (and presumably the wiring and the woofer voice coil). In doing so, it aims to similarly cancel out nonlinearities.

All this was finished in a gorgeous piano-black gloss... and who can do piano-black gloss better than Yamaha?

Both stereo line and speaker-level inputs are provided, along with a dedicated LFE input. The latter bypasses the low pass filter, as is best when using the crossover built into a home theatre receiver. There are also speaker-level outputs for passing the signal on to normal loudspeakers. The full signal is passed on, unfiltered.

A 'System Connection' socket allows the subwoofer to be connected to other Yamaha equipment so that it switches on and off under system control.

The level control and a power switch are at the front on an angled section above the driver, providing easy access. The other controls are at the back: normal/reverse phase, crossover frequency (marked from 40 to 140Hz) for when using the speaker or line-level inputs, auto on/off and a switch for the 'Bass Action Selector System'. This last has two positions — one for 'Music' and one for 'Movie'. I will discuss this further shortly, but just note here that 'Movie' is the one to go for, and the one I used for my listening.

“smooth bass extended down to encompass the lot, barring the fundamental frequency of the 16Hz C pedal on a pipe organ...”

Performance

I ran through quite a few CDs containing the most effective bass, produced on synth, electric instruments, or acoustically (primarily pipe organ in this case). The result was smooth bass that extended down deeply enough to encompass the lot, barring the fundamental frequency of the 16Hz C pedal on a pipe organ. Walking bass jazz music was supple, tuneful and clear, and even in output level across the range.

One track in particular caught my ear. It was from a CD I picked up many years ago, largely of Chinese works, called ‘Hugo Audiophile CD1’. The second track — called ‘Overture of “Dagger Society” Suite’ — features a Chinese orchestral introduction which pauses twice for what be the most astonishing bass drum ever committed to recording media. This was delivered with superb impact, and equally superb control, and with the following bass reverberant ringing neither emphasised nor diminished by the subwoofer.

Measurements



Yamaha may have chosen to trade some of those rare infrasonics for power, clarity and musicality further up.

The ‘Movie’ setting (blue trace) gave a significantly smoother frequency response than the ‘Music’ setting (orange). With respect to ‘Movie’, ‘Music’ was a couple of decibels higher at around 75Hz, and a couple of decibels lower at around 30Hz. With the ‘Movie’ setting, 30 and

75Hz were within a couple of decibels of each other.

In either case, it was clear that even bass extension went out to 27Hz and then fell away rapidly below that point (with 20Hz at -18dB in the best case). The final ± 6 dB measurement was 25 to 175Hz.

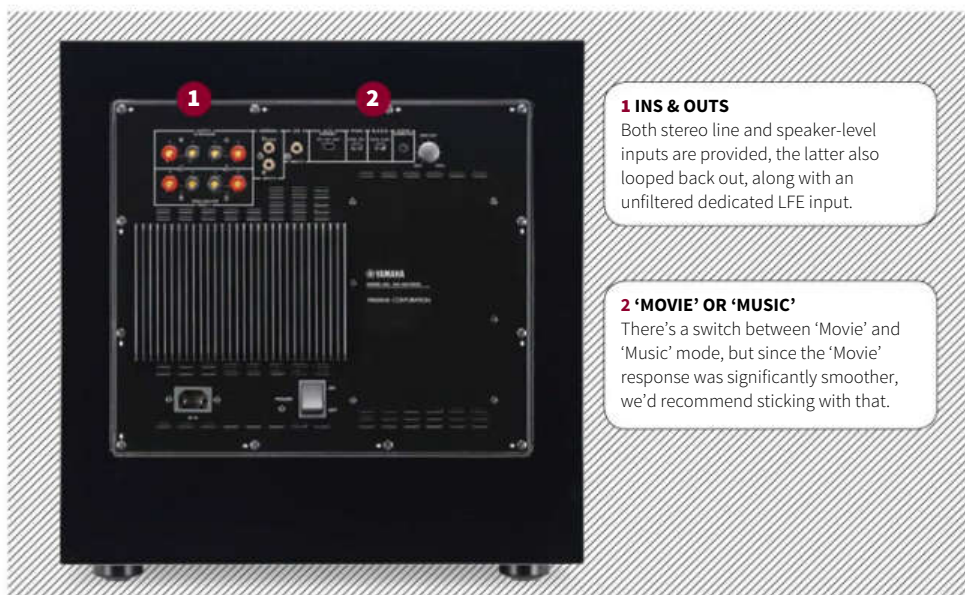
It certainly seems that AST II did do something about nonlinearities, resulting in quite a low distortion level: for 30Hz, 90dB at one metre, the second harmonic was 1.33% and the third 0.32%. The 4th and 5th harmonics were 0.11% and above that fell below 0.04%.

When it came to movies, this subwoofer seemed to have a limitless capacity with regard to volume. As with music, it was highly accurate, delivering the outrageous thuds and clunks and rumbles of movie soundtracks throughout its frequency range. Missing, though, was the complete room pulsing from the likes of ‘Titan A.E.’, due to the lack of infrasonic delivery (see ‘Measurements’ panel). Likewise with the dinosaur footsteps on one of my test discs. On this the first couple are meant to sound distant, and are thus almost entirely in the sub-20Hz region, but this subwoofer only barely hinted at these.

It seems that Yamaha has traded depth (for those only occasionally used infrasonic tones) in order to focus on power and clarity and musicality. It’s a trade-off that seems quite sensible.

Conclusion

With the Yamaha NS-SW1000, the company has a fine subwoofer able to match for quality its excellent electronics components and, for example, its Soavo range of loudspeakers. *SD*



1 INS & OUTS

Both stereo line and speaker-level inputs are provided, the latter also looped back out, along with an unfiltered dedicated LFE input.

2 ‘MOVIE’ OR ‘MUSIC’

There’s a switch between ‘Movie’ and ‘Music’ mode, but since the ‘Movie’ response was significantly smoother, we’d recommend sticking with that.

SPECS

Yamaha NS-SW1000

\$2999

Drivers: 1 x 300mm, forwards firing

Enclosure: Bass reflex

Inputs: 1 x stereo line level, 1 x LFE, 1 x stereo speaker level (4 x binding posts)

Outputs: 1 x stereo speaker level

Low-pass crossover: 40-140Hz

Quoted power: 1000 watts

Measured room response (pink noise -6dB): 25-175Hz

Level at 20Hz: -23dB (music), -18dB (movie)

Dimensions: 463 x 443 x 522mm

Weight: 42.6kg

Warranty: Two years

Contact: Yamaha Music Australia

Telephone: 1300 739 411

Web: au.yamaha.com



Up in size and dramatically in weight over the SUB 250 also in this test, this SUB 600 showed how to make the most of the extra power and dimensions.

Dynaudio SUB 600

A sweet-spot among our subwoofers, the SUB 600 is compact but delivered bass with depth and timing.

SUMMARY

Dynaudio SUB 600
subwoofer
Price: \$3299

- + Excellent bass extension
- + Very high levels available
- + Compact enclosure

- No, nothing bad to report

If you've already read the Dynaudio SUB 250 II review, you can think of the Dynaudio SUB 600 thus: take that smaller sub and increase everything by 25% to 50%. It is still pretty much a cube. And indeed, still quite a compact cube, but noticeably more substantial. It has a larger driver — the full 12-inch 300mm versus the smaller 240mm on the SUB 250. This takes up its front panel just as completely as is the case for the smaller sub.

The amplifier gets 300W rather than the 200W for the smaller unit. The company doesn't say much about

the amp, other than it was produced in collaboration with the company's pro division. (If you know pro-audio, you'll know that Dynaudio active monitors are the monitors of choice for some of the world's top mixing studios.)

One thing that has been increased by more than 50% is the weight. This unit registers at 21kg on the scale, nearly three times the measure of the small one. For a compact sub it is very heavy indeed. And that is needed, of course, given that the enclosure is sealed, and so requires a great deal of strength to resist the compressive and expansive forces of the contained air.

Again, there are seven different finishes, including five wood finished, but here the black and white are provided with a piano-gloss finish (white pictured left) rather than the matte of the SUB 250.

What haven't changed are the connections and controls. A separate unfiltered LFE input is fitted along with stereo line-level inputs which are subject to the filter. The polarity can be flipped. The stereo line-level outs can be set to deliver the same signal as that input, or to high-pass filter it at either 60 or 80Hz, for better performance from compact speakers. The LFE signal can be passed on to a 'slaved' additional subwoofer (indeed, multiple subs can be daisy-chained in this way).

Performance

As Crocodile Dundee might say, now *this* is a subwoofer. For as long as I've been interested in high fidelity, 20Hz has been stressed as the bass goal to be reached, and yet it has been so rarely delivered. It soon became apparent that this speaker, if not achieving that, came very close.

Track after track of music had its bass end handled with ease, from the 80Hz crossover down to the lowest audible frequencies, with no apparent diminution, and with tunefulness, with timing.

And also with ferocity when called for. I span up the original 1979 Telarc '1812 Overture' (on CD). For all the

“Its performance is something against which other subs should be judged...”

clipping in the recording, this still makes cannon sound the way they ought to — if the bass capabilities of your speakers are up to it, of course. The Dynaudio SUB 600 most definitely is, with a percussive punch that gave the climax this music deserves.

Of course, such a strong performance can be occasionally uncomfortable, leading to not-so-neighbourly complaints when seemingly limitless bass escapes, as it usually will, from your listening room. Or when you're playing such tracks as 'Maybe' on Janis Joplin's 'I Got Dem Ol' Kozmic Blues Again Mama', in which some powerful 26Hz bass kerthumps, quite unrelated to the music of the song,



Measurements



Sealed and delivered: only -4dB down at 20Hz, and within -6dB up to 205Hz, the Dynaudio proved an excellent sub.

By the time I reached this Dynaudio, I had been through a series of subwoofers, measuring them as I went, and they all seemed to exhibit a limitation of their bass extending down only to the mid-20s. I had done a check before I started with my own subwoofer by way of check my setup, and it recorded a 15.5 hertz extension. But after such a series of measurements my confidence was wavering and I was wondering if something in my measuring set-up had changed.

But then I measured the Dynaudio SUB 600 and confidence

was restored. For within the ± 6 dB measurement envelope, this sub reached out to 18.2Hz.

Indeed, its performance is right up there as perhaps the smoothest and certainly one of the widest of the subs in this collection.

Its performance is actually something against which most other subs should be judged. That it comes from such a compact unit both startles and supports my view that sealed enclosure subs are the best, if done properly. Within the ± 6 dB test band I use, this subwoofer delivered 18 to 205Hz.

If you want to go tighter, it managed 22 to 147Hz ± 3 dB.

Quite a few of these subs were down -18dB or more at 20Hz. With its shoulder at 23Hz, and with the relatively gentle bass slope inherent in sealed box designs, this sub was -18dB at 13.75Hz. At 20Hz it was -4dB.

I was expecting there to be some cost to this performance in the distortion figures, but they turned out to be quite respectable. With the 30Hz tone running at 90dB at 1 metre, the second harmonic was around 2.1%, the third at 0.6% and higher orders at 0.1% or less.

managed to make it past the engineers' not-so-keen ears (or speakers) into the mix. This was reproduced by this subwoofer with a full measure of disquiet.

Meanwhile, the timing and extension delivered excellent results with movies. The low-frequency content of 'Titan A.E.' pulsed the room properly, suggesting a degree of even infrasonic performance.

Conclusion

You have to hand it to Dynaudio. With the SUB 600 it has pulled truly excellent performance out of a remarkably compact subwoofer, and managed to do so without a major cost in distortion, and for a quite reasonable price. *SD*

SPECS

Dynaudio SUB 600 \$3299

Drivers: 1 x 300mm, forwards firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 1 x LFE

Outputs: 1 x stereo high pass, 1 x LFE pass through

Low-pass crossover: 50-150Hz

Quoted power: 300 watts

Measured room response (pink noise -6dB): 18-205Hz

Level at 20Hz: -4dB

Dimensions: 420 x 350 x 370mm

Weight: 21kg

Warranty: Three years

Contact: BusiSoft AV

Telephone: 03 9810 2900

Web: www.busisoft.com.au



1 Line-level inputs and outputs

Stereo line-level inputs are subject to the filter knob, while the line-level outs can be set flat or high-pass filtered at either 60 or 80Hz.

2 LFE input

A separate unfiltered LFE input is fitted and the LFE signal can be passed on to a 'slaved' additional subwoofer or multiple subwoofers.



The Revel B110 was a good looking (you know, for a sub), performed well and offered great versatility by tweaking with a computer and software.

Revel Performa 3 B110

Excellent tuning via software allows the very best results from this subwoofer which proved tuneful, fast and powerful above the lowest of infrasonics.

SUMMARY

Revel Performa 3 B110
subwoofer
Price: \$3845

- + Extremely powerful performance above 25Hz
- + Tuneful and fast delivery with music
- + Superb tuning facilities

- No effective output at 20Hz
- Fairly high 2nd harmonic distortion

Revel's Performa 3 series B110 subwoofer is a ten-inch unit in an extremely sturdy (25kg) enclosure, finished in a nice black piano gloss (white and walnut are also available). The sturdiness is necessary because the coated paper-pulp cone of the driver has up to 1000W driving its excursions of up to 50mm against the pneumatic suspension of the air locked into this sealed enclosure.

The subwoofer accepts mono or stereo inputs via either RCA sockets or balanced XLR. In addition it has line-level outputs in both forms, with the stereo ones high-pass filtered. There is also a summed mono output in both RCA and XLR form for running the signal through to another subwoofer. There are trigger

functions and a USB-B socket for use with a computer.

The B110 is supremely controllable, although it might not seem so at first glance. Indeed, the only controls on the back panel are for level and for how the unit is to be switched on and off. There isn't even a phase reversal switch.

There actually is, but it comes in software form. You download the Revel Low Frequency Optimizer software and install it on a Windows computer. Then you plug in the subwoofer via that USB socket. With the software you can back up the subwoofer's existing DSP settings to your computer — or, more commonly, you can use the software to control the subwoofer.

How much? Just about everything you can think of. You can flip the polarity of the subwoofer. You can set the crossover frequency in 1Hz steps to anything between 50 and 200Hz. Don't like the type of crossover? Choose from 1st, 2nd, 4th or 8th order Butterworth, 4th or 8th order Linkwitz-Riley. This applies both to the subwoofer's own operation and the subwoofer line-level output provided for daisy-chaining to other subs. Or you can just switch off the crossover.

If you are using this subwoofer in a stereo system with compact main speakers, then it lends a hand by allowing the same options for the high-pass filter for the signal output.

But most importantly, you can set EQ curves to adjust for problems in your room. Among the adjustments is a 10-band parametric equaliser with adjustable centre frequencies and Q (width of effect) settings. There's provision for comparing measured curves and target curves, and using these to make adjustments. That last requires you doing some measurement using external equipment — the downloadable manual advises on this. It's pretty technical, and while some will be interested in doing this, others may require dealer assistance, especially as additional software and a measurement

“fast and tight, never giving the slightest hint of overhang on impulses...”

microphone is required. The possibilities are effectively limitless. I used the default out-of-the-box settings first, and then with the EQ manually tweaked by reference to my measurement system.

Performance

You know, I kind of fell in love with this subwoofer. It's reasonably compact, it's quite pretty (at least as far as subwoofers go), and it had a real presence in our system. With music it was fast and tight, never giving the slightest hint of overhang on impulses, just doing its job of effectively filling in the bottom two octaves of sound.

On movie sound, it delivered excellent levels of slam when required. On reflection, this ability to go extremely loud tended to mask the relative lack of infrasonic underpinning of the kind offered by my regular subwoofer. But because it was so solid from around 25Hz and up, it produced the psychological effect of full and complete sound. In a way this can actually seem slightly preferable because it wasn't delivering the sometimes acoustically oppressive effect of high levels of infrasonic sound.

Measurements



The Revel's response can be tailored using a computer and the supplied software — the blue line is with EQ, orange without.

In standard trim (the orange line in the graph above), the measured response was less extended than I had felt from listening, as mentioned in the main review here. The curve adopted a classic parabolic shape, with peak output around 60Hz, and with the range from 40 to 80 hertz essentially flat. By 26Hz, the output

was falling away rapidly. I did some tweaking with the software option, applying a couple of boosts using the EQ facility. This smoothed out the area from 25 to 40Hz (blue line). I didn't attempt to boost the output significantly below the point the fast descent commenced — only bad can result from that.

I checked the distortion without any EQ applied. The second harmonic distortion was fairly high at the 30Hz test frequency at over 4%, though I can't say that I noticed this during use. The third harmonic was at a fittingly low 0.4% and higher order distortion products were much lower still.

And while it did not deliver some of the deeper components of, for example, the Telarc 1912 cannon, it remained well controlled, with no suggestion of stress.

I'm guessing that the power supply of this subwoofer is optimised for 60Hz power systems, for a moderate amount of 50Hz hum was generated by the system. When I measured the distortion components for a 30Hz signal (with the output set to 90dB SPL at one metre), the 50Hz output was clearly visible in the frequency spectrum, lower than the level of the second harmonic distortion, but higher than the third harmonic. Had it been a distortion component, it would have been at

1.8%. That said, I only ever noticed it when I got up close to the subwoofer's corner, never once during normal use.

Conclusion

The Revel Performa 3 B110 proved to be a wonderful subwoofer, perhaps not down at the very bottom for those who are not interested in infrasonics, but with its excellent tuning capabilities in particular, it would be hard to find a place in which it would not fit. *SD*



1 In and outs

Mono or stereo inputs are via either RCA sockets or balanced XLR, with line-level outputs in both forms, the stereo ones high-pass filtered. There is also a summed mono output in both RCA and XLR form for easily chaining more subs.

2 Controls

The Revel is deceptively simple in having just a volume knob and trigger selector, but you can plug your computer into that USB socket to gain enormous versatility using software.

SPECS

Revel Performa 3 B110

\$3845

Drivers: 254mm, forwards firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 2 x balanced XLR

Outputs: 1 x stereo high pass, 2 x balanced XLR high pass, 1 x LFE, 1 x XLR LFE

Low-pass crossover: 50-200Hz

Quoted power: 1000 watts (RMS)

Measured room response (pink noise -6dB): 26-158Hz (no EQ), 23-150Hz (EQ)

Level at 20Hz: -18dB (no EQ), -17dB (EQ)

Dimensions: 428 x 364 x 342mm

Weight: 25.4kg

Warranty: Five years (one for amplifier)

Contact: Advance Audio Australia

Telephone: 02 9561 0799

Web: www.advanceaudio.com.au



One driver fires from the front, but the other is upsidedown, apparently firing up into the cabinet. What's going on?

the front driver fires outwards in a conventional way, the driver mounted in the base appears to fire inwards — into the interior of the enclosure, with its magnet and basket on the outside.

But it is wired with reversed polarity, so as the front driver's cone is moving outwards, so is the second cone. The two drivers are working in concert, but one is emitting the bulk of its sound from the back, through the gaps in the basket.

Why? Because if there were any nonlinearities in the driver cone moving in one direction, it is expected that these would be cancelled out by the other cone moving in the other direction.

The two drivers are pushed by a 400-watt amplifier. The large enclosure comes only in one finish: satin black, as pictured, with a black grille provided. It is also provided with floor spikes.

This subwoofer is THX Ultra2 certified, which is the highest level on offer. In order to meet those certification requirements, the subwoofer must, in addition to providing very high levels, be able to deliver 20Hz at -6dB.

The subwoofer has stereo in and out connections via both XLR and RCA. For single-channel LFE connections you just connect to the left channel of either. There's a bypass switch which cuts out the low-pass filter. The outputs are all straight through, unfiltered.

There are also several THX reference settings. One is a switch which fixes the subwoofer at the THX recommended level. Another provides a THX-compliant EQ curve for the output. The other position is labelled 'Anechoic MK EQ'. M&K Sound explains this clearly in the manual. The THX position sets the output to be -6dB at 20Hz, while the MK setting is designed for less low frequency extension (-12dB at 20Hz) and, 'is intended to be used for smaller rooms and music reproduction'. I disagree. I think music is better — assuming it has sufficiently deep bass content — when the response is flat as far

M&K Sound X12

THX Ultra2 certification should indicate a product that “bring the cinematic experience to larger home theatres”. And this proved true of the M&K Sound X12.

SUMMARY

M&K Sound X12
subwoofer
Price: \$4999

+ Enormous levels available
+ Extremely low distortion
+ Excellent performance with music

- Small amount of 50Hz hum

In my mind at least, M&K subwoofers are most special in their unusual dual-driver configuration, as on this model. And the M&K Sound X12 is the brand's current top-of-the line subwoofer, both in this format, and for its full range.

It features two 300mm drivers in a large sealed enclosure. But only one of these is obvious to the eye because it is mounted on the front, under the removable grille, and is forwards firing. The other is mounted on the underside of the enclosure. It can be seen through a large rectangular cut-out. And here's the thing: while

“controlled, not in the slightest overblown, and beautifully nimble”

into the bass as possible. This might seem self-evident in hi-fi terms, but it is, I suppose, a matter of taste.

Performance

I did the listening test with the THX EQ mode selected. I sometimes praise a small subwoofer by noting that it sounds like a large one. Now I have to reverse that. Aside from the fact that this subwoofer reaches way, way down, it sounds like a small subwoofer. It's controlled, not in the slightest overblown, and beautifully nimble in the way it underpins the main speakers with bass beyond their capabilities. Why might that be? Lower distortion perhaps?

Whatever. The thud of a kick drum was delivered entirely as a thud, without the slightest hint of harmonics to mar it. Complex bass guitar lines were tracked precisely, and at an even level across the fret board.

I sensed, when playing my go-to bass test tracks, that there wasn't a huge amount of infrasonic material, but in a sense it wasn't really missed because of

the seemingly limitless ability to deliver 20Hz and up at any survivable level. As the cannon hit home on the original Telarc 1812 recording, with the receiver set to 'Reference' level (i.e. with 0dB registered on the display), I could see the front driver's cone leap, and felt the physical shock of the pressure wave, yet it was clean and clear and seemingly completely undistorted.

As with some other subwoofers designed for 60Hz markets, there was a small amount of 50Hz hum generated, low enough in level not to be at all detectable



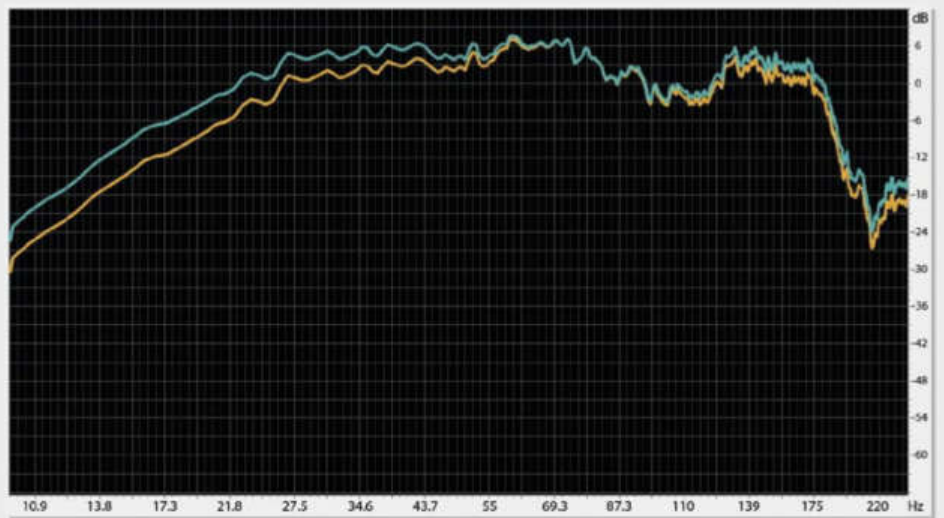
1 Ins and outs

Stereo in and outs are provided on both XLR and RCA. For single-channel LFE you just connect to the left channel of either. The outputs are all straight, unfiltered.

2 EQ modes

This little dip switch selects between MK mode (intended for smaller rooms and music reproduction) and a THX-compliant EQ curve to deliver 20Hz at -6dB. We preferred the THX mode for all uses.

Measurements



Two curves for the two settings — orange for the M&K setting, blue for the THX setting, which we'd pick in preference.

M&K's talk about the EQ curves pretty much accorded with our own measurements, which also had them 6dB different at 20Hz: -9dB for the 'MK' curve (orange curve) and -3dB for the 'THX' setting (blue). I guess I chose a different reference point for my measurements. In any event, for MK the subwoofer managed 21.7 to 184Hz within ± 6 dB, and a rather

more extended 18.6 to 186Hz for THX. I'd always choose THX, except perhaps if I wanted to disturb the neighbours a little less.

So, what to make of this alleged cancellation of nonlinearities? Does it work? The distortion measures are relevant here. This subwoofer had the lowest second harmonic distortion of them all: on the test

signal just under 0.9%, compared to values from other excellent subs ranging from 1.1% to over 4%. The third harmonic wasn't quite so remarkable, coming in at 0.45%, still low enough to be effectively inaudible. The fourth: 0.008%! The fifth, back up to a tiny 0.06%. (That may have been in part contamination by a harmonic of the 50Hz leakage.)

by ear in the room proper, but audible when I put my head into the corner right above the subwoofer.

Conclusion

The M&K Sound X12 subwoofer is a truly wonderful unit with magnificent, undistorted coverage from the high ultrasonic up. And in addition, the THX Ultra 2 certification provides a certain high level assurance of performance. SD

SPECS

M&K Sound X12

\$4999

Drivers: 2 x 300mm, forwards & down-firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 1 x stereo XLR

Outputs: 1 x stereo line level, 1 x stereo XLR

Low-pass crossover: 50-125Hz

Quoted power: 400 watts

Measured room response (pink noise -6dB): 21.7-184Hz (MK EQ), 18.6-186Hz (THX EQ)

Level at 20Hz: -9dB (MK EQ), -3dB (THX EQ)

Dimensions: 660 x 440 x 460mm

Weight: 36kg

Warranty: Three years

Contact: QualiFi

Telephone: 1800 24 24 26

Web: www.qualifi.com.au



The bottom section of the DB1 is a separate amplifier module and can rotate to most conveniently suit your location.

Bowers & Wilkins DB1

B&W's top-of-the-line subwoofer combines convenience and software control with spectacular performance — it had us walking down the street to hear the results.

SUMMARY

Bowers & Wilkins DB1

subwoofer
Price: \$5500

- + Massively extended bass
- + Enormous levels available
- + Excellent performance with music
- Third harmonic distortion higher than expected

The DB1 is Bowers & Wilkins' top-of-the-line model. For your \$5500 you get a 44kg design of wood and metal that stands 500mm tall on its feet or spikes (both are supplied), with a footprint of 640 by 410 metres. It isn't the biggest of this subwoofer collection — though it seems like it when you're carrying it.

Inside an extremely sturdy sealed enclosure are two 300mm drivers on opposing faces. That means the subwoofer has an extremely large radiating surface. This is powered by a semi-separate amplifier module, perhaps 50mm tall, on which the enclosure rests. This

has a dark brushed aluminium face all the way around, and it also carries all the connections. The electronics module and the enclosure are joined by a short cable — hidden in a cavity in the base — with a Neutrik SpeakOn connector. You are encouraged, if it suits your installation requirements, to undo the screws joining the two and rotate the base 90 degrees one way or the other for convenient access to the connectors.

The driver cones are made of a Rohacell material. This is a sandwich construction with a kind of skin placed over a core of air-filled cells, providing high rigidity with low weight. The amp is rated at 1000 watts output continuous and has extensive DSP processing.

The enclosure of the review unit was a beautifully finished real cherry wood veneer. It is also available in the gloss black pictured here, and rose nut.

There is no mucking around here with passing signals on and such: the B&W DB1 has inputs only. There's a pair of stereo RCA inputs, plus a single LFE RCA input, plus a balanced XLR LFE input. For control there is an RS-232C socket, two input triggers and an IR input. There's also a USB-B for firmware updates.

Aside from the soft power switch on the front, all control is exercised using an arrow cluster and a small LCD display on the amplifier section. (Adjusting this may involve you getting down on the floor.) At the top level is preset and volume selection. Drilling down you can change the phase to one of four positions, set the crossover to somewhere between 25 and 120Hz and set the slope of the crossover (12 or 24dB/octave), select from or edit and save preset EQ curves. The EQ adjustment provides five bands from 20 to 80Hz at half-octave intervals.

But you can go much further. Provided with the subwoofer is a measurement microphone, microphone cable, USB microphone sound card and a USB-to-RS-232C adaptor cable. You can download the Windows SubAPP software from the B&W website and exercise even greater control. In

**“No limitation...
The bass was
still audible four
houses away...”**

particular, you can use the measurement functions to adjust for room effects.

Performance

It took a while, but I managed to find a limitation to this subwoofer! I played ‘Jurassic Lunch’ from a test Telarc DTS-CD. The insanely deep and powerful footsteps, when I had the amp advanced to a ridiculous level, sounded suddenly floppy, and then the sub’s blue ‘on’ light went momentarily red, indicating the DB1’s protection circuitry was being triggered.

But it survived and played the track clearly and powerfully without those events when I backed the volume off by three decibels. Let’s be fair: this disc warns of “high levels with infrasonic frequencies to 5 hertz”. From eye, it was some of those fivers that were causing the problem.

Everything else? No limitation. I played the opening minutes of ‘Titan A.E.’, and the delivery was suitably brutal with the air of my largish room throbbing with bodily detectable infrasonic energy. I put this section on a loop, left my office, closed its door and wandered down the street. The bass was still audible four houses away, in the

Measurements



Now that’s a subwoofer curve! Our -6dB measurement envelope went all the way down to 14.2Hz. Infrasonics ahoy!

The immense tuning capabilities mean that if the subwoofer is physically capable of producing an element of the signal, it can be tweaked into perfect balance in

just about any given environment. I conducted this measurement on the default ‘Preset 1’ with no additional EQ applied. So take these measurements as a ‘worst case’.

So, measured up close (to reduce low frequency room effects), this subwoofer delivered within my ± 6 dB measurement envelope from 14.2 to 120Hz. Yikes! Want infrasonics? That’s what this sub gives, plus of course the lowest three ‘audible’ octaves.

At 20Hz the output was right on the centre line of the measurement envelope. There’s a very gently tapering off below that to 16.5Hz, and then the taper becomes steeper. I have no doubt that B&W’s claimed 18Hz within ± 3 dB would be yielded under laboratory measurement conditions.

The distortion products were a little unusual in that the third harmonic was a tad higher than the second, and the fifth a little higher than the fourth. But, in order, at 1.25%, 1.41%, 0.1% and 0.32%, none is particularly troubling.



afternoon, with the distant traffic trying to drown it out with its own bass rumblings.

With the content of music it was supple and detailed, and nicely timed. On each and every track I tried. It does smooth and musical as well as it does big and brutal.

Conclusion

The Bowers & Wilkins is clearly one of the very best subwoofers on the market at the moment. For those who do want the best. *SD*

1 Socketry

Inputs only on the DB1, with stereo RCAs, a single LFE RCA, plus a balanced XLR LFE input. For control there’s RS-232C, two input triggers, an IR input, and a USB-B for firmware updates.

2 Controls

The bottom section is a separate amplifier module with sockets on the back and an electronic pad on the front for settings — but software control is also available, and the DB1 comes with a microphone, sound card and adaptor cables.



SPECS

Bowers & Wilkins DB1 \$5500

Drivers: 2 x 300mm, sideways firing

Enclosure: Sealed

Inputs: 1 x stereo line level, 1 x LFE, 1 x XLR LFE

Outputs: Nil

Low-pass crossover: 25-120Hz

Quoted power: 1000 watts

Measured room response (pink noise -6dB): 14.2-120Hz

Level at 20Hz: -0dB

Dimensions: 500 x 460 x 410mm

Weight: 44kg

Warranty: Two years

Contact: Convoy International

Telephone: 02 9700 0111

Web: www.convoy.com.au



The REL is large, it's heavy, but it has some remarkable convenience features, including a built-in wireless receiver.

REL Acoustics 212/SE

The largest, heaviest and most expensive subwoofer in our group doubles up the drivers from our current award-winner for devastatingly powerful effect.

SUMMARY

REL Acoustics 212/SE
subwoofer
Price: \$6499

- + Astonishing volume levels available
- + Very low distortion
- + Wireless option
- Not effective at 20Hz

UK firm REL — winner, incidentally, of *Sound+Image*'s 2015 Subwoofer of the Year — has released its massive new subwoofer, the 212/SE. This turned out to be the most expensive, largest and heaviest of the 13 subwoofers in our review collection.

It weighs more than 55kg. It stands over 800mm tall. It has a footprint of 436 by 507mm. It has adopted basically the same 300mm driver used in *Sound+Image*'s award-winner (the S/5), tweaked for this model. But it uses two of them, in a forwards-firing configuration,

one above the other. Each driver has a cast metal-alloy 'cone', actually a smooth inverse dome rather than the conventional cone, plus dust cap. REL says that these have a linear excursion range of a wide 50mm.

The massive enclosure is loaded by two 300mm passive radiators. These sport cones similar to those used in the drivers. One is mounted in the base, firing so to speak downwards, while the other is in the back panel. That means that you need to leave a little breathing room between the radiator and the rear wall with this subwoofer.

The built-in amplifier is rated at 1000W 'RMS' (which I take to mean continuous), and 1700W peak.

The enclosure was finished in piano-gloss black, with a detachable black cloth grille. A silver REL logo panel is on top, while there are two odd metal straps on the side. They look like handles, but are too shallow to get your fingers around.

The controls and inputs are at the back. There are no outputs. There are four kinds of input. A single RCA socket is provided for LFE (that is, unfiltered), and this has its own dedicated level control. A stereo analogue line-level input is provided, as is a single speaker-level input using a Neutrik SpeakOn socket. A cable is provided for this last, along with wiring instructions so that both stereo channels can be fed to the subwoofer. Both this and the stereo line-level are under the control of the low-pass filter, and they share a level control.

Finally, if your room presents particular wiring challenges, this subwoofer includes a most unusual feature for a high-end subwoofer: it has a built-in wireless receiver. You will need to purchase the matching 'LongBow' transmitter (\$399) to use this.

More than one of the inputs can be employed at a time, and REL's recommended configuration is always to have high-level and LFE inputs used simultaneously to achieve the best effect; by receiving the full speaker signal (which should not, obviously, be low-pass

“The amount of energy this subwoofer proved able to deliver was astonishing.”

filtered by your receiver), the REL thereby underpins your main speakers, as well as receiving the dedicated LFE bass channel.

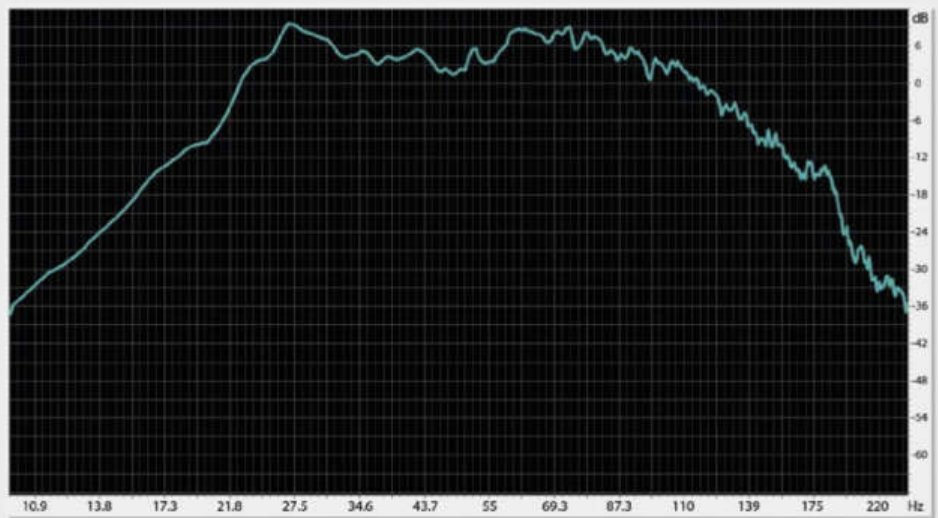
Performance

To leave room for the rear radiator, I put the unit in the usual corner, but angled at 45 degrees. So how did it sound? There are two aspects to it. First, let's go loud.

Do you recall stories about alleged torture of prisoners through the playing of loud music? The REL 212/SE could well be suitable for the bass part of that, given the volume levels it will achieve, except for one thing: it sounds too damned good. I put on the Blu-ray of 'Heat', jumped to the airport chapter near the end, and turned up the receiver to reference level. And, oh, what a thrill. As jet aircraft taxied past, and others took off and landed, the massive rumble and pulsing of air in the room was seemingly unlimited.

When it came to 'Titan A.E.', it was the same but even more so. The amount of energy this subwoofer proved able to deliver to the listening room was astonishing. At some point in the manual REL says this subwoofer is designed to

Measurements



Engineered for power at 25Hz up, and outstandingly clean, the Revel was great for music and even better for home theatre.

Because of the dual drivers

here I had some trouble finding a good representative location for my microphone to close-mike the frequency output of this subwoofer. In front of the drivers, the contribution of the passive radiators was diminished. In the end I found a place that seemed to capture equally the contributions of all the parts of this subwoofer, and the results were somewhat surprising.

I had felt that infrasonic performance would be strong, judging by the pulsating air filling my listening room, but in fact little of that was evident in any of the measurements. They all showed the response extending out to 27Hz, then diminishing rapidly below that point. Even so, a ± 3 dB band encompassed from 24 to 95Hz, while my standard ± 6 dB envelope went from 22-127Hz. The output was down by 12 decibels

at 20Hz. So it seems that this unit has been engineered for power at 25Hz and up, rather than to be deeply extended into low bass. There would be few subs so well engineered for that particular purpose.

This subwoofer proved to be the one to deliver the lowest distortion figures at the 30Hz test frequency: just 0.78% second harmonic, 0.33% third, 0.14% fourth. No wonder it sounded so clean.

be able to 'play shatteringly loud'. Shattering is a good word, but it's a shattering via the administering of pure, undistorted signal.

With such headroom available, the subwoofer spent most of its time barely idling, loping along comfortably, totally unstressed. Thus with regular music it delivered its component of the music with superb accuracy without in any way drawing attention to itself. Yet when the music went to a climax of orchestral drum, or

Chinese orchestral drum, or indeed an 1812 Overture cannon, it roared.

Conclusion

While the REL 212/SE performs very well with music, especially with mighty crescendos, it really comes into its own with home theatre work. With these, it is seemingly without volume limit. *SD*



1 Inputs

There are three types of inputs, plus a surprise — RCA for LFE, stereo line level, and a single speaker-level input using a Neutrik SpeakOn connector.

2 Wireless connection

You can also switch the REL to wireless connection — the receiver is built in, but you'll need REL's optional 'LongBow' transmitter (\$399).

SPECS

REL Acoustics 212/SE

\$6499

Drivers: 2 x 300mm, forwards firing

Enclosure: 2 x 300mm passive radiator

Inputs: 1 x stereo line input, 1 x LFE, 1 x mono speaker level input (SpeakOn)

Outputs: Nil

Low-pass crossover: 30-120Hz

Quoted power: 1000 watts

Measured room response (pink noise -6dB): 22-127Hz

Level at 20Hz: -12dB

Dimensions: 816 x 436 x 507mm

Weight: 55.3kg

Warranty: Two years

Contact: Synergy Audio Visual

Telephone: 03 9459 7474

Web: www.synergiaudio.com

group test **subwoofers**



Brand	Sumiko	Krix	Dynaudio	M&K Sound	Krix	Velodyne
Model	S.5	Seismix 3 v.6.0	SUB 250 II	V8	Volcanix Slim	SPL1200U
Price	\$999	\$1095	\$1399	\$1499	\$1995	\$2899
	+ - Very good value for money - Fine musical performance - Useful connectivity options	- Good musical performance - Solid LFE performance - Good value for money	- Wonderfully compact - Good musical performance even when very loud - Respectable LFE performance	- Pleasing musical performance - Good levels with LFE operation - Compact design	- Very high levels available - Good musical performance - Good fit for certain installations	- Enormous levels available - Very low distortion - Solid LFE performance
	- - High 3rd harmonic distortion - Not effective for deep bass	No effective output at 20 hertz	- Fairly high 3rd harmonic distortion - No effective output at 20 hertz	- High distortion levels - Not effective at 20 hertz	No effective output at 20 hertz	No, nothing negative to report
Description						
Driver/s	1 x 210mm	1 x 275mm	1 x 240mm	1 x 203mm	1 x 305mm	1 x 305mm
Driver description	Very long throw, treated paper cone, wide rubber surround	Paper cone, 50mm long throw voice coil	Long throw, 100mm voice coil, Magnesium Silicate Polymer cone	Pulp cone, aluminium voice coil former, extended pole piece, aluminium shorting ring	Paper cone, 50mm long throw voice coil	Kevlar reinforced resin cone, diecast aluminium basket, in/outside wound 'Dual Tandem' voice coil
Driver orientation	Downwards firing	Forwards firing	Forwards firing	Forwards firing	Forwards firing	Forwards firing
Enclosure type	Sealed	Bass reflex	Sealed	Sealed	Bass reflex	Sealed
Port orientation	N/A	Forwards firing	N/A	N/A	Twin, downwards firing	N/A
Inputs	1 x mono line input, 1 x LFE, 1 x mono speaker level input (SpeakOn)	1 x stereo line level	1 x stereo line level, 1 x LFE	1 x stereo line level	1 x stereo line level, 1 x stereo speaker level (4 x binding posts)	1 x stereo line level, 1 x stereo speaker level (4 posts)
Outputs	Nil	1 x stereo line level	1 x stereo high pass, 1 x LFE pass through	1 x stereo line level	Nil	1 x stereo high pass
Low pass crossover	30-120Hz	50-200Hz	50-150Hz	60-150Hz	50-195Hz	40-135Hz
Filter bypass	Yes	Yes	Yes	Yes	Yes	Yes
Auto on/off	Yes	Yes	Yes	Yes	Yes	Yes
Phase control	0/180 degrees switch	0-180 degrees continuous	0/180 degrees switch	0-180 degrees continuous	0/180 degrees switch in software	0/90/180/270 degrees
Other features	Separate level controls for LFE and other inputs	-	Choice of high pass filter for line out	-	Trigger in, Slimline design	DSP, auto calibration, trigger, IR input, remote
Dimensions (hwd)	335 x 285 x 315mm	450 x 360 x 410mm	271 x 266 x 308mm	340 x 260 x 290mm	630 x 500 x 295mm	394 x 380 x 470mm
Weight	14kg	15.65kg	7.2kg	10.3kg	24.3kg	20.7kg
Manufacturer's specifications						
Amplifier (watts)	150 watts (RMS)	300 watts (RMS)	200 watts	150 watts	450 watts (RMS)	1200 watts (RMS)
Specified frequency response	-3dB @ 40 hertz, -6dB @ 30 hertz	22-200 hertz -6dB	29-250 hertz ±3dB	30-200 hertz ±2dB	16-200 hertz -6dB	21-135 ±3dB, 13-240 hertz overall
Measurements						
Cone diameter (not counting roll surround)	143mm	191mm	154mm	150mm	225mm	221mm
Total cone area	161cm ²	287cm ²	186cm ²	177cm ²	398cm ²	384cm ²
Room frequency response (Pink Noise ±6dB)	33-146Hz	29-153Hz	27-158Hz	25.6-158Hz	24-163Hz	18.5-167Hz
Level at 20 hertz (ref average level)	-28dB	-30dB	-16dB	-11dB	-15dB	-2.5dB
Distortion 30Hz 90dB SPL** 2nd/3rd... harmonic %	1.82/10.6/0.84/0.50	3.0/0.53/.02/0.12	3.35/5.01/0.16/0.28	10.6/6.3/0.33/0.27	1.12/0.28/0.05/0.08	1.50/0.35/0.05/0.12
Warranty	2 years	5 years (1 year for amplifier)	3 years	3 years	5 years (1 year for amplifier)	2 years
Contacts						
Distributor	Synergy Audio Visual	Krix Loudspeakers	BusiSoft AV	QualiFi	Krix Loudspeakers	Revolution Technologies
Telephone	(03) 9459 7474	1300 005 749	03 9810 2900	1800 24 24 26	1300 005 749	07 3902 8051
Web	www.synergyaudio.com	krix.com.au	www.busisoft.com.au	www.qualifi.com.au	krix.com.au	www.revolutiontechnologies.com.au

** For stated output at one metre

						
Sunfire XTEQ10	Yamaha NS-SW1000	Dynaudio SUB 600	Revel Performa 3 B110	M&K Sound X12	B&W DB1	REL 212/SE
\$2999	\$2999	\$3299	\$3845	\$4999	\$5500	\$6499
• Very high levels available • Excellent auto-calibration system • Extremely compact	• Fine musical performance • Extremely powerful performance above 25 hertz • Solid LFE performance	• Excellent bass extension • Very high levels available • Compact enclosure	• Extremely powerful performance above 25 hertz • Tuneful and fast delivery with music • Superb tuning facilities	• Enormous levels available • Extremely low distortion • Excellent performance with music	• Massively extended bass • Enormous levels available • Excellent performance with music	• Astonishing volume levels available • Very low distortion • Wireless option
• Not effective at 20 hertz • 2nd harmonic distortion a bit high	• No effective output at 20 hertz	• No, nothing to report	• No effective output at 20 hertz • Fairly high 2nd harmonic distortion	• Small amount of 50 hertz hum	• Third harmonic distortion higher than expected	• Not effective at 20 hertz
1 x 254mm	1 x 300mm	1 x 300mm	1 x 254mm	2 x 300mm	2 x 300mm	2 x 300mm
Long throw, high back-EMF	Semi-pressed paper cone with Kevlar fibres, double layer ferrite magnets, diecast aluminium frame	Magnesium Silicate Polymer cone, double magnet, diecast aluminium basket	Coated Paper/Pulp cone, 50mm two layer copper voice coil, vented triple stacked ceramic 5 magnet assembly, vented diecast aluminium frame	Pulp cone, cast open baskets, aluminium pole spacers, aluminium shorting ring	Rohacell cone, long throw	Cast alloy cone, 50mm linear stroke, die cast aluminium chassis
Sideways firing	Forwards firing	Forwards firing	Forwards firing	Forwards & downwards firing	2 x sideways firing	Forwards firing
Passive 254mm radiator	Bass reflex	Sealed	Sealed	Sealed	Sealed	2 x 300mm passive radiator
Sideways firing	Sideways firing (right)	N/A	N/A	N/A	N/A	Rear & downwards firing
1 x stereo line level, 1 x XLR LFE, 1 x Slave	1 x stereo line level, 1 x LFE, 1 x stereo speaker level (4 x binding posts)	1 x stereo line level, 1 x LFE	1 x stereo line level, 2 x balanced XLR	1 x stereo line level, 1 x stereo XLR	1 x stereo line level, 1 x LFE, 1 x XLR LFE	1 x stereo line input, 1 x LFE, 1 x mono speaker level input (SpeakOn)
1 x stereo high pass, 1 x Slave	1 x stereo speaker level (4 x binding posts)	1 x stereo high pass, 1 x LFE pass through	1 x stereo high pass, 2 x balanced XLR high pass, 1 x LFE, 1 x XLR LFE	1 x stereo line level, 1 x stereo XLR	Nil	Nil
30-100Hz	40-140Hz	50-150Hz	50-200Hz	50-125Hz	25-120Hz	30-120Hz
Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yes	Yes	Yes	Yes	Yes	Yes	Yes
0-180 degrees continuous	0/180 degrees switch	0/180 degrees switch	0/180 degrees switch in software	0-180 degrees continuous	0/90/180/270 degrees in software	0/180 degrees switch
DSP, auto calibration, trigger	Yamaha system remote connection, active servo	Choice of high pass filter for line out	Trigger in/out, Extensive DSP processing	THX Ultra 2 certified, Distortion cancelling driver placement	DSP, Calibration equipment and software, RS-232C, triggers	Separate level controls for LFE and other inputs, wireless capability
290 x 315 x 290mm	463 x 443 x 522mm	420 x 350 x 370mm	428 x 364 x 342mm	660 x 440 x 460mm	500 x 460 x 410mm	816 x 436 x 507mm
24.8kg	42.6kg	21kg	25.4kg	36kg	44kg	55.3kg
2700 watts	1000 watts	300 watts	1000 watts (RMS), 2000 watts (peak)	400 watts	1000 (continuous)	1000 watts (RMS)
18-100 hertz	18-160 hertz	18-250 hertz ±3dB	Not stated	20-200 ±2dB	17-145 hertz ±3dB, 15 hertz @ -6dB	-6dB @ 21 hertz
165mm	Grille not removable	212mm	185mm	223mm (x 2)	217mm (x 2)	221mm (x 2)
214cm ²	Grille not removable	353cm ²	269cm ²	781cm ²	740cm ²	767cm ²
25.6-119Hz	26-174Hz (music) 25-175Hz (movie)	18-205Hz	26-158Hz (no EQ) 23-150Hz (EQ)	21.7-184Hz (M&K EQ) 18.6-186Hz (THX EQ)	14.2-120Hz	22-127Hz
-17dB	-23dB (music) -18dB (movie)	-4dB	-18dB (No EQ) -17dB (EQ)	-9dB (M&K EQ) -3dB (THX EQ)	0dB	-12dB
3.98/0.40/0.03/0.05	1.33/0.32/0.11/0.11	2.11/0.60/0.10/0.06	4.5/0.40/0.06/0.22	0.89/0.45/0.008/0.06	1.25/1.41/0.1/0.32	0.78/0.33/0.14/0.20
3 years	2 years	3 years	5 years (1 year for amplifier)	3 years	2 years	2 years
QualiFi	Yamaha Music Australia	BusiSoft AV	Advance Audio Australia	QualiFi	Convoy International	Synergy Audio Visual
1800 24 24 26 www.qualifi.com.au	1300 739 411 www.yamahamusic.com.au	03 9810 2900 www.busisoft.com.au	02 9561 0799 advanceaudio.com.au	1800 24 24 26 www.qualifi.com.au	02 9700 0111 www.convoy.com.au	03 9459 7474 www.synergiaudio.com

Tune your subwoofer



Happily there's now an app for all this, but you'll still need to crawl around the floor, advises greg borrowman.

Whether you're enhancing a stereo system or adding the required depth to your home cinema, a subwoofer will only do the job if it is properly tuned to your system and your room. Volume, crossover frequency and phase controls need to be set in such a way that the subwoofer's output integrates perfectly with that of the main stereo or front/main loudspeakers.

Very few people, even experts, are capable of doing this by ear. And until recently, the measuring equipment required to correctly tune a subwoofer was expensive. But now, thanks to the processing power inside any smartphone, it is possible to accurately calibrate a subwoofer with a \$10 app and a low-cost CD with appropriate test tones.

Positioning

Before you start any calibration, you should first position the subwoofer correctly in your room. There is much nonsense published about positioning a subwoofer, the most egregious of which is that you should not place one in a corner. This advice is wrong... sometimes a corner is one of the very best places you can put a subwoofer! (However, you most definitely should not place full-range loudspeakers in corners unless that speaker is one of the rare models specifically designed for corner-mounting.)

The best way to work out the ideal position for your subwoofer is to do the whole thing in reverse. Place the subwoofer where your head would normally be (use furniture, milk crates, whatever it takes), and then play a DVD or CD with deep bass. Turn up the volume of the subwoofer a little higher than normal.

Then crawl around the floor and put your head in all the different

positions you might put your subwoofer. As you crawl around, you'll hear the bass alternately get stronger and weaker... at some points the bass might be so weak that you will barely hear it at all.

Mark all the spots where the sound is strong by sticking some white electrical tape to the carpet. Once you have covered the entire floor area, your carpet should be littered with bits of white tape.

If you only ever listen to your system yourself, you can now move the subwoofer to the most convenient or least conspicuous place here there's a bit of tape and a nearby power point.

If you are likely to have multiple listeners in the room, you will have to physically move the subwoofer to where their head would usually be, and repeat the entire 'crawling around the floor' process. If the bass is still strong at a taped point, leave the tape on the floor. If the bass is now weak at this point, remove the tape.

In theory, you could continue this process for each person who could be listening, but the availability of 'good' places will narrow once you're past three people. DO NOT try to 'compromise' by putting the subwoofer anywhere there is not a piece of white tape!

One CD, one app

With your sub positioned, you can start the calibration process. For this you will need a suitable test CD, such as the Stereophile Test CD2 (usually

around \$13 + postage from the US, or as a bundle of all three Stereophile test discs). You will also need a Real Time Analyser, which in days not far past would have set you back thousands of



SCREEN 1: The Android 'Audio Tool RTA' app in SPL mode, measuring a 100Hz warble tone from Stereophile Test CD2. You can see from the blue 'soft' keys that the averaging is set to 'Off', the mode is 'SPL', Meter Response is set to 'Medium' and that weighting is set to 'Flat'. The two small tabs visible between the tabs that show 'SPL' and 'Medium' are for Peak Hold (On/Off) and Valley (On/Off).



SCREEN 2: The app showing frequency response after calibration extending from 25Hz - 200Hz ± 3 dB. Some extra tweaking could have reduced the slightly 'high' result for the three third-octave bands above 63Hz, but I preferred the sound of the slight forwardness in this region, and also wanted to show that you don't need to achieve absolute flatness. Getting all the third-octave bars within ± 3 dB in a normal acoustically untreated room is a good outcome.



dollars, impractical for the purpose of a single home subwoofer calibration. These days, thanks to the computing power inside a smartphone, you can buy an app that will turn your phone (or tablet) into a Real Time Analyser.

The best RTA app for iOS devices (iPhone, iPad) comes from Studio Six Digital [www.studiosixdigital.com] and is available in Apple's App Store for \$9.99. For Android, the best RTA app available is part of AudioTool (\$7.49) available on Google play (tinyurl.com/audiotool-app).

We did try many free SPL meter apps, and (less readily available) free Real Time Analyser apps, but all of them had intrusive advertising and some might run up big data charges (or worse!) on your account even when they're not being used. Bite the bullet and pay the \$10!

Of course, smartphone apps use the phone's inbuilt microphone, and there is no guarantee that the microphone's frequency response will be flat. In fact the smartphones I experimented with proved flat enough to allow accurate calibration, but both apps do allow an external microphone (I'd recommend the Dayton imm-6, around \$50 plus \$10 shipping from www.theloudspeakerkit.com). Anyone who is regularly calibrating subwoofers should use a pro portable RTA, such as NTI's XL2 fitted with the M4260 microphone (www.nti-audio.com) available in Australia from Amber Technology.

Alignment procedure

Position your phone at the listening position, where your head would be, and where you can easily see the screen and make adjustments to the parameters. Set the RTA app on your phone to its SPL mode, then set the 'Meter Response' to 'Medium', and the 'Weighting' to either 'Flat' or 'No Weighting'. (If the RTA app you're using offers neither of these options, instead select 'C-weighting'.)

Disconnect the subwoofer from your amplifier or receiver and play the test CD through the main speakers using the 100Hz warble tone on Stereophile Test CD2 (Track 16, Index 4). While playing the warble tone, gradually increase the volume level on your amplifier/receiver until the SPL meter shows a figure of somewhere between 70dB SPL and 80dB SPL. This should be at least 10dB above background noise — if the background level is more than 60dB SPL, increase the calibration level by 1dB for every dB above 60dB SPL. So if the background noise level is 63dB SPL, use a calibration level of 73dB SPL. In fact the actual level is not crucial, but you do need to make a note of it. Leave your amplifier/receiver's volume control at the position that gave this level and DO NOT touch it again.

Now turn the main speakers off (disconnect the speaker wires if there's no button for this), then reconnect the subwoofer, with its volume knob set to zero, its phase control set to 0

degrees, and the subwoofer's crossover control set at its highest possible frequency. Now play the 100Hz warble tone again, slowly increasing the level of the subwoofer's volume control knob until the sound pressure level reading on your phone is back at the noted calibration level (73dB SPL, or whatever).

Leave the subwoofer's volume control knob in this position.

Now change the function of your smartphone app from 'SPL' to 'RTA', and apply the following settings: Display Spectrum: 1/3rd Octave; Averaging: Off; Peak Response: Off; Speed: Medium; Weighting: Flat or None; Frequency Range: 20Hz to 200Hz.

Reconnect the main speakers!

Then play Stereophile Test CD2's Track 15 (pink noise at -20dBFS), and while it's playing adjust the vertical resolution of the screen (by pinching or spreading your fingers) until each horizontal calibration is 6dB and all the vertical bars are on-screen. The overall indicated SPL level will not be the same as the one you previously noted; this is normal. DO NOT adjust any volume controls.

Now, look at the third-octave analyser spectrum on your phone to see whether all the vertical bars are relatively flat and smooth across the screen (as in Screen , left). Don't be concerned that the vertical bars are dancing up and down a little. If the vertical bars at 31.5Hz and above are all fairly uniform in level (within ± 3 dB), you're done: the maximum setting of the crossover control is the best setting for your subwoofer to cross over to your main speakers. [You can disregard the left 25Hz vertical bar, because this can't be adjusted.]

If the response is not within ± 3 dB, slowly move the subwoofer's crossover control anticlockwise from its maximum while watching the RTA spectrum display, until you get the flattest response possible. If the response is relatively flat, you're done: this setting of the crossover control is the best for your subwoofer to cross over to your main speakers.

If you can't achieve a relatively flat response, adjust the subwoofer's crossover control to where the response was the most flat, and then slowly adjust the phase control, while still looking at the RTA spectrum. As you adjust the phase you should see the levels of the various vertical bars change. After you've tried ALL settings of the phase control, move it back to the position that gave you the flattest response and leave it there: you're done. You have correctly set



Adjust volume first, as described, then leave it alone while adjusting crossover and, if necessary, phase.

your subwoofer's volume and phase controls to positions that allow your subwoofer's output to best-integrate with the output of your front left and right loudspeakers.

If you're still unhappy with the flatness of the response, return the phase control to 0°, then adjust the subwoofer's crossover to the position that gave the second-flattest response, and do the phase variation all over again. If you're still unhappy, adjust the subwoofer's crossover to the position that gave the third-flattest response, and again do the phase variation. If you're still not happy, continue this iteration procedure until you are.

Whatever you do, DO NOT alter the position of either your subwoofer's volume control or the volume of your amplifier/receiver to try to 'fix' the response. You will only end up wrecking all the work you've done. You must ONLY adjust the crossover and phase controls on the subwoofer.

Resist future temptation

Now that you've finished, you can finally put your head where it should be, in the listening position, and play a track with deep bass (Track 1 of Pink Floyd's 'Dark Side of the Moon' should do) to hear the balance of the subwoofer with your speakers.

DO NOT attempt to adjust the level of the subwoofer to increase the level of deep bass! Most music contains deep bass only at very low levels, so it should be reproduced at those same very low levels. Movie sound effects contain more deep bass than most music tracks, but you should still resist the temptation to increase the level of bass issuing from your subwoofer: the rule-of-thumb is that if the deep stuff sounds obvious, then the subwoofers's volume level has most likely been set too high.

greg borrowman

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Beyonwiz T2
personal video recorder



T for two

Beyonwiz releases a versatile two-plus-one-tuner PVR with app control, streaming, and even silent SSD hard-drive options.

Beyonwiz has added a third model to its “T” series of personal video recorders. So far we have seen the three-tuner T3, and the T4 with four. So this new T2, of course, has two tuners. But don’t feel short-changed, for it comes with an additional USB tuner.

Equipment

As with the other models, you can buy the T2 with a range of hard-disk sizes (see panel, left), with two new options here using SSD (Solid State Disk): \$599 for 250GB and \$699 for 500GB. The nice things about these? They are totally silent. Beyonwiz has even been able to dispense with the cooling fan for the T2, so the only thing you can hear is the occasional chatter of the hard-drive read/write heads. With SSDs there’s not even that.

Beyonwiz says that the T2 is good for recording up to eight programs at once from two different broadcasters — three if you use the supplied tuner dongle. Obviously the total length of recordings depends on the size of the hard disk.

It is the entry-level unit of the range in other ways. First and most obviously it is a far smaller unit, only 260mm wide, and very light at less than a kilogram, in part because the power supply is external. Also it does not have a front-panel display. Indeed, there’s no obvious indication whether the unit is on or not,

other than what appears on your screen. This one does not offer PIP either.

The unit has HDMI output, plus composite video, stereo analogue audio and optical digital audio. A short cable daisy-chains the pass-through aerial output from one tuner to the next. The USB tuner comes with its own short cable which can plug onto the second tuner’s pass-through. In addition to the USB socket on the back, there’s another on the front under a flap, plus Ethernet and RS-232C. Wi-Fi is supported with the addition of an optional Wi-Fi dongle.

The fundamental operating system here is Linux, with an overlaid interface called WizOS. The Linux underpinning means there’s room for the expansion of capabilities. The 500MHz MIPS processor provides somewhat faster performance than the T3, but remains slower than the premium T4. And since the last time we looked at a Beyonwiz PVR, the company has launched an Android and iOS app called WizOS (shown above).

Performance

Not surprisingly the unit starts up with a Wizard. This allows you to select your time zone and location (it looks like TV stations are pre-programmed for a number of areas, but not our test area of Canberra). A full scan grabbed all my local stations within a couple of minutes.

SUMMARY

Beyonwiz T2 personal video recorder

Price: \$399 (500GB)

Also: \$299 (no HDD), \$449 (1TB), \$599 (250GB SSD), \$699 (500GB SSD)

- + Excellent recording of up to eight programmes at once
- + Good value for money
- + Very fancy WizOS app

- Can’t delete TV channels without upsetting numbering
- No frame step on playback



The Beyonwiz T2 has HDMI, composite and component output options, and optical digital audio too.

It is possible to remove duplicate channels, but only at the cost of renumbering — e.g. delete the ABC duplicate 21, and ABC 2 is renumbered from 22 to 21.

The unit also supports FreeviewPlus, but it was woefully slow and eventually got in a tangle. However the ABC iView and SBS On Demand apps work fine. If you want more than the standard free-to-air EPG, you can take advantage of three free months of IceTV, and if you like it, subscribe afterwards.

The free-to-air picture quality was good. The colours and contrast levels were accurate and scaling was fine. The deinterlacing seemed to be always in a motion-adaptive video mode which gave reasonable results, although sometimes resulted in unnecessary moire patterns and the like.

The unit defaulted to 1080i output, but also supported 1080p and the other standard resolutions including 576i, so you can have the unit upscale or output natively. This setting is well down the menu system, though, not something you're going to want to change every time you flip between HD and SD stations. Our ideal remains a setting in which the output resolution automatically matches the program resolution.

Among the things that a nerd like me loves: the highly detailed information on the pop-up information panel, even down to which tuner is in use, and the resolution of the picture in pixels.

The T2 certainly seemed a very stable platform, aside from FreeviewPlus. As I write, there are 10 shows recording from the two tuners plus the USB one at the same time, and an 11th show is network streaming to an iPad using the WizOS app. I set the unit to recording both manually, and by choosing things from the EPG. The unit adds pre-and-post recording padding of a length you can choose, and there's highly flexible series recording. All worked properly.

Manual recording is flexible with a set of menu choices for how long you want the recording to be. If you rewind live TV a little first (this is on by default) then you can choose whether you want the time-shift buffer saved. That's great for when you decide you want to record something after it has started.

And time shift is on by default. There is no setting for how long a buffer you want. It will just keep on adding more to the memory for as long as you remain on the one station and don't play something else back — if you leave it on all day in that condition, then you can rewind for hours. And you can save each programme that is stored there individually, selecting them by name. And usefully if you rewind live TV just a little, then you will be warned if you try to do something that will purge the buffer.

Playback was flexible too. You can set skip amounts on up to five sets of keys. Fast forward and rewind can go up to 128x, and if you hold down an arrow key you can move along a time bar to anywhere within the programme within a few seconds. There's pausing, but no slow motion nor frame advance.

You can control the unit via a web interface (type its IP address into your browser) and you can download and upload media to a computer using any FTP software (hint: username is 'root').

The WizOS software was a surprising gem. In addition to replicating the remote control, it displays the EPG and allows you to set up recordings from there, to see and edit timers, and to play back your recordings or watch live TV on your smart device. It will even work over the internet if you gather the necessary information from your T2... except for the streaming. (For that you need a T4 which can transcode live TV and recordings to something that will work better over the internet. The distributor provided me with log-on information for a T4 located I know not where, but probably in Sydney, and this did indeed work, although there was some breakup of the picture.)

The T2 supports DLNA playback, but I'd be reluctant to use it as my main way of accessing DLNA content. The interface is slow and pretty clunky. The unit acts as a DLNA player, but not as a renderer, which means you can't use an Android or iOS app to send media to it. Also, while it played such things as 192kHz-sampled FLAC files, it down-sampled them to 48kHz before passing them on via HDMI to the receiver. One oddity — an old MPEG test clip with

native resolution of 704 by 576 (rather than the more usual 720 by 576) had its aspect distorted into a short, squat appearance on playback.

As a DLNA server, though, it was impressive, allowing its recordings to be played anywhere on the network.

It also has some apps ready to run: YouTube TV, Last.FM, SHOUTCast, Flickr, Web Cams, a Gmail reader, a web browser and, of course, weather information. For best use of some of these you should plug in a keyboard and mouse.

The unit's menus have a slightly scattershot approach to control. When the auto station tuning completed it told me to hit 'OK', which I did, and no stations were memorised. I did it again, more carefully, and realised that it meant press the green key, which was labelled 'OK' on the screen. The colour keys have inconsistent functions depending on where you are in the menu system. And half the time you have to use the red key to Exit instead of the 'Exit' key.

Incidentally, despite the lack of a fan, even after many hours of heavy use, the T2 was only slightly warm to the touch. It uses a 2.5-inch notebook-style hard drive, and these tend to produce less heat than the full-sized ones. But it also means that the capacity is limited to 2TB, compared to the 6TB available in large hard disks.

Conclusion

The Beyonwiz T2 is a fine, powerful PVR with decent picture quality and tremendous versatility. Plus if you get one with an SSD (or the 'bare bones' model and install your own) you'll have just about the only totally silent PVR on the market.

Stephen Dawson



SPECS

Beyonwiz T2
personal video recorder \$299-\$699

Tested with firmware: 4.4/3.14.2

Outputs: 1 x HDMI, 1 x composite video, 1 x stereo analogue audio, 1 x component video, 1 x optical digital audio, 2 x aerial loop out

Inputs: 2 x aerial

Other: 2 x USB, 1 x Ethernet, 1 x RS-232C

Storage: 500GB HDD (see text for other options)

Dimensions: 260mm wide by 60mm tall by 175mm deep

Weight: 0.93 kilograms

Warranty: 12 months

Contact: Digital Trading Co

Telephone: 02 9603 1822

Web: www.beyonwiz.com.au

Hugo Nielssen with the legendary Contour 1.8



Contour S 3.4 LE

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Denon DNP-730AE
network audio player



Streaming for a song

Denon's network player achieves sound quality to match streamers twice its price by omitting standalone DAC abilities. We were impressed.

SUMMARY

Denon DNP-730AE
network audio player
Price: \$849

- + Excellent sound quality
- + DLNA and AirPlay streaming
- + Good file compatibility, including DSD

- No external inputs to operate as a DAC

Denon's DNP-730AE network audio player is a component-style audio source for delivering high quality digital audio to stereo systems. Perhaps the most surprising thing about it is the price — at \$849 it is substantially lower in cost than many devices filling a similar space.

Equipment

The DNP-730AE sits comfortably in a home theatre or hi-fi system, thanks to its conventional shape and width. The review unit featured a good old-fashioned brushed-aluminium fascia, although black is also available.

A largish blue-on-black text display shows menus on the front panel, including what's currently playing. A control cluster to the right allows you to navigate the menus, while a button is provided for source selection. A standby/on key is at the left, and a USB socket is also on the front panel — this can be

used for playing back music on USB flash drives or even hard drives, but is probably most useful for the connection of iPods, iPhones and iPads.

Around the back output is provided in the form of stereo analogue audio and optical digital audio. There is, of course, an Ethernet socket, and there are also two antennas for Wi-Fi, so the unit need not be in close proximity to network cabling. The unit uses the 2.4GHz band only for Wi-Fi.

Unlike some of the more expensive music streaming units, this one does not have a USB-B socket, so it can't be used as a USB Audio DAC direct from your computer. Indeed, it has no digital inputs at all, so it cannot be used as a DAC for anything other than the music it is itself streaming.

So what will the unit stream? Essentially that falls under four categories: DLNA audio, AirPlay audio, Spotify Connect and internet radio. So the first covers Windows and Android-



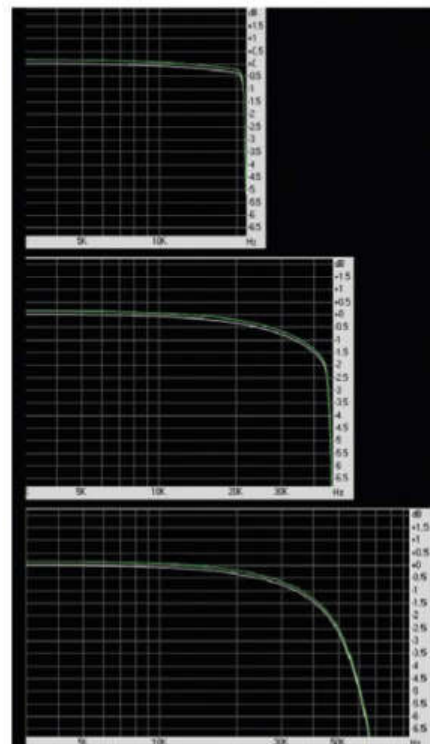
Measurements

With 16-bit/44.1kHz (i.e. CD standard) music the frequency response was treated to a relatively gentle roll-off — at a bit above 20kHz the response was down by 0.4dB from its peak. Noise was around the theoretical minimum for 16 bits at -97.1, dBA rated.

With 24-bit/96kHz signals the same relatively slow filter was employed, albeit without the brick wall slightly above 20,000 hertz. The response was down around 1.5dB at 40kHz. The noise floor was at -110.3dBA.

Moving up to 24-bit/192kHz, the same response curve was maintained, except without the quickening as it nears 48kHz. The -3dB point was around 52,000 hertz, and -6dB was at 63,000 hertz. The noise performance was just about the same as at 96kHz sampling.

Signal	16/44.1	24/96	24/192
Noise, dBA	-97.1	-110.3	-110.3
Dynamic range, dBA	95.8	110.5	110.3
THD %	0.0012	0.0012	0.0014
IMD + noise %	0.0044	0.0018	0.0021
Crosstalk dB	-98.3	-106.3	-106.2



style households. The second covers Macs and iOS devices. The third, Spotify Connect, will require that service's 'Premium' subscription (about \$12 a month) and provides your choice of just about any music at fairly good quality. The fourth allows access to just about any radio station throughout the world that streams its services over the internet (that's 36,358 of them as I write).

The unit packs a Burr Brown/Texas Instruments PCM1795 32-bit 192kHz DAC. The unit supports sampling rates up to 192kHz and 24 bits, where available. The lossy formats it will handle are WMA, MP3 and AAC (including the iTunes version). For lossless it handles WAV, FLAC, ALAC (up to 96kHz

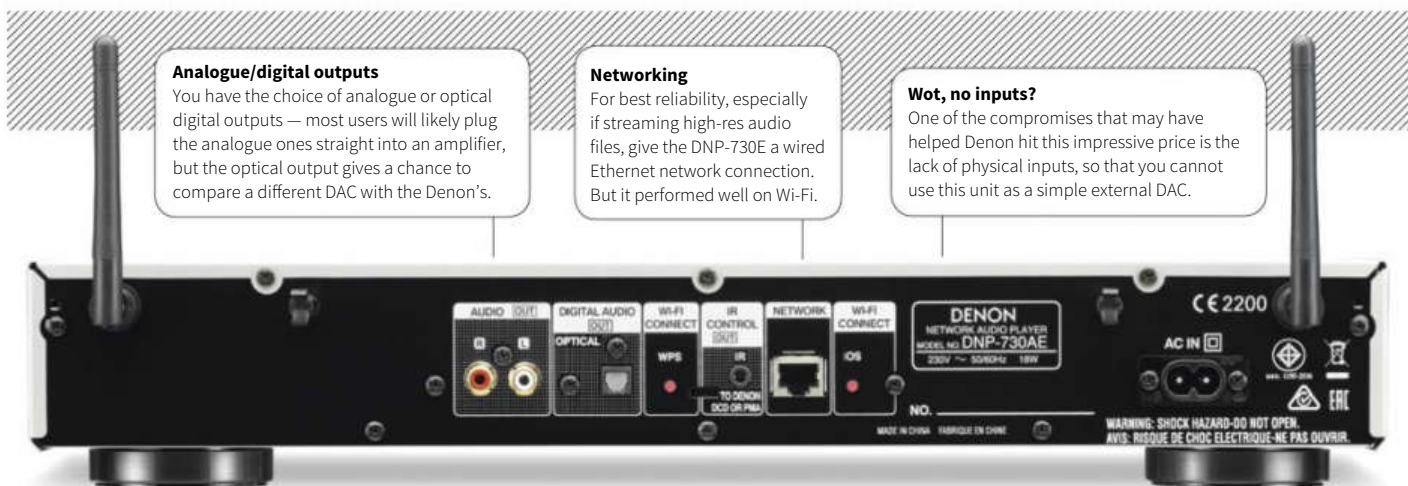
only) and AIFF. It also handles DSD with both 2.8 and 5.6MHz sampling (aka DSD64 and DSD128). A close look at the PCM1795 datasheet suggests that the DAC chip switches to a proper DSD mode when handling such signals, so DSD purists can be happy that the signal isn't being converted to PCM along the way.

Control

An infrared remote control is provided with the unit. This is capable of controlling some other Denon equipment as

well, and for this purpose such things as a volume control are included. The output of the unit itself is fixed.

We held out as long as possible with this review, hoping for a substantial improvement in the Denon Hi-Fi Remote app, and an update arrived just as we hit our deadlines. The good news is that it's less bad than the previous version, in that it doesn't seem to crash out completely. But it remains difficult and unintuitive to use, and from our experience it was buggy and slow to respond. And easily confused. I sent a





“the Denon is one fine bit of kit for streaming digital audio, so long as you don’t need to use it as computer DAC or standalone converter...”

song from iTunes to the Denon via AirPlay. When it finished playing, I used the app on an iPad Mini to send a DSD album. It played the tracks fine, but for the first one it showed the track title as... ‘AirPlay’, even though it reported the tech details as ‘DSD 2.8224MHz’. When the next track started it showed its title properly. At the third track it kept showing the second track’s title for about 20 seconds before switching over. By the fourth track it got into stride.

The Android version was even worse. Its user rating in the Play Store as we write is 2.1/5, and we reckon people are being kind.

However, this needn’t put you off the DNP-730AE itself. Denon will presumably get the apps working well soon enough, and if you persevere you might even work out how to use it efficiently. Meanwhile, you can just use a different app. If you’re using an Android device there are a wealth of them — I use BubbleUPnP, but there are plenty of others, mostly free ones. For iOS you can throw any music from the device itself and other streaming apps using AirPlay, but for browsing networked content the choices are relatively limited. Most are locked into



particular brands of hardware, though there are plenty that allow you to play DLNA content on your iOS device. In the end, the Sony Audio Remote app for iOS worked well enough, allowing me to send music from some of my DLNA servers to any DLNA-capable device, including the Denon.

Connecting

The relative simplicity of connections here means you have two choices to make — how to connect to the network, and how to connect the audio output.

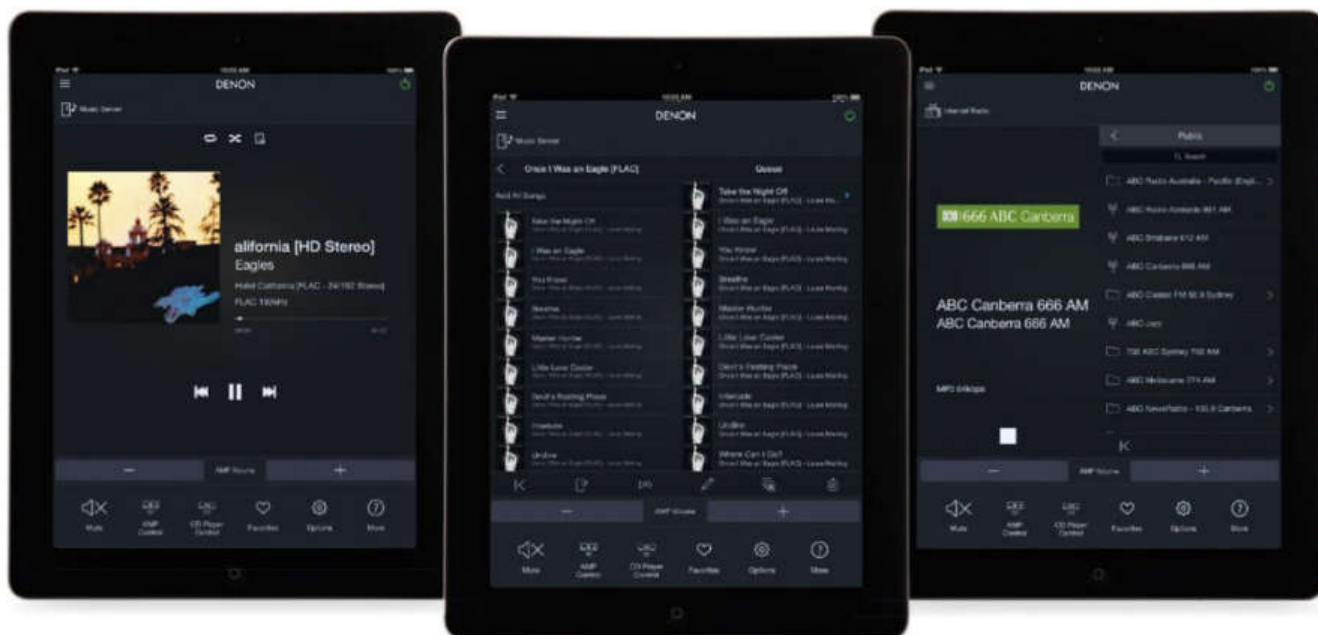
If you have an Ethernet connection handy, you should use that rather than wireless, especially if you’re planning to stream high resolution audio. How reliably Wi-Fi will work with said audio is largely a function of your Wi-Fi environment: distance, quality of the Wi-Fi access point, how many other devices are operating.

For what it’s worth, in my rather electrically busy office but with a fairly close range, 192kHz FLACs and 2.8MHz DSD seemed to stream reliably, but 5.6MHz DSD dropped out badly. I used a wired network connection almost exclusively for the tests.

There are several ways to establish the Wi-Fi connection. I couldn’t get the one where your iOS device can find the unit wirelessly to work, and when I tried the one where you plug in your iOS device and the Denon learns its settings, the Denon complained that it wasn’t using a compatible network standard. Hmmm. I used the ‘Autoscan, select, enter password’ method on the same Wi-Fi access point and the unit connected quickly and properly. It also supports WPS and manual detail entry.

As for output, you will almost certainly just want to use the analogue audio outputs. As we’ll see they offer wonderfully high quality sound, and they are compatible with just about all your stereo music. But there is one circumstance in which you might want to use the optical digital audio output instead: if you are using a home theatre receiver and if you want to play content ripped from DTS CDs. This data looks like PCM to most devices, so if you have the DNP-730AE decode it you will just get high levels of white noise. But if output via optical to a home theatre receiver it will be recognised as multi-channel DTS and decoded appropriately

✓ The Denon's control app proved flaky for us, sometimes too easily confused, but this will likely be addressed by updates, and there are third-party apps available for free which control streaming to the Denon more smoothly.



✓ When your smart device isn't handy, the Denon's physical remote control is your saviour. This includes buttons such as volume to allow it to control a whole Denon system.



(this, incidentally, is a good test of whether a device is bit-perfect in its audio handling). The trade-off for that option would be that you can't get DSD (or even DSD converted to PCM) from the optical output, nor any 32kHz sampled stuff.

Performance

Apart from our grave doubts about the Denon Hi-Fi Remote app, the Denon DNP-730AE performed wonderfully. The hardware and internal software worked swiftly and effectively with everything. It popped up as an AirPlay device on iTunes and iPad, and when music was sent to it via AirPlay it typically took three or four seconds to switch over. Likewise with Spotify.

Most of our critical listening was with FLAC music fed via DLNA. You can use the front panel display and the remote to navigate to the music you want, but it is far more efficient to use an app... any app really,

even the Denon one. As mentioned, using BubbleUPnP to push DLNA music to the media player provided a nice mixture of convenient and reliable operation.

The unit fully supports gapless playback, eliminating those nasty pauses between what are supposed to be run-on tracks, even when the music is being DLNA pushed.

The sound quality was simply wonderful. I spent an extended period with this unit and had it feeding music through a wide range of electronics and loudspeakers. The results were uniformly excellent. Whatever was in the music file, that was what was delivered by the Denon DNP-730AE, no more and no less (at least within the ability of human to detect).

Third-party apps generally won't support the internet radio function, so you will need to use the Denon app for that, or the remote and the front panel. This uses the vTuner system, so unless you're into station surfing, you'll probably want to register the unit at radiodenon.com. There you can do some very easy searching and mark your favourite stations as, well, 'Favorites'. There are two kinds of 'Favorites' in this unit. One is the list maintained within the internet radio function (which is what this process creates), available a couple of menu levels down into it. The other is built into the unit with keys on the remote. Whatever is currently playing can be added with the press of the 'Add' key. That can include internet radio stations,

so it's best to put your real favourites in that. There are 50 slots available.

Conclusion

If you find the Denon app as difficult as we did, well there are plenty of alternatives, most of them free. Otherwise the Denon DNP-730AE network media player is one fine bit of kit for streaming digital audio, so long as you don't need to use it as a computer DAC or standalone converter, because of that lack of inputs. Its sonic performance is up there with rival units at \$1500. *Stephen Dawson*



SPECS

Denon DNP-730AE

\$849

Inputs: 1 x USB-A, 1 x Ethernet, Wi-Fi

Outputs: 1 x analogue stereo (RCA), 1 x optical digital

Other: 1 x IR out

Frequency response: 2-96,000Hz (PCM @ 192kHz); 2-20,000Hz (PCM @ 44.1kHz); 2-50,000Hz -3dB (DSD)

S/N: 115dB (PCM/DSD, Audible range)

Dynamic range: 100dB (PCM, Audible range); 105dB (DSD, Audible range)

Harmonic distortion: 0.002% (PCM, 1 kHz, Audible range); 0.001% (DSD, 1 kHz, Audible range)

Dimensions (whd): 434 x 73 x 297mm

Weight: 2.9kg

Warranty: Three years

Contact: QualiFi Pty Ltd

Telephone: 1800 24 24 26

Web: www.qualifi.com.au

LG 65UF950T

4K UHD TV



Flat and proud

While LG has a near-exclusive on the joys of OLED, its flagship LED-LCD models (UF950T) offer more screen for the money. And they're flat. We like it flat.

SUMMARY

LG Electronics

65UF950T UHD TV

Price: \$6499

- + Excellent picture quality
- + Flat not curved
- + Fast and usable interactive capabilities
- + Generally good network functions

- EPG information not retained when TV put in standby

Three models in LG's flagship LED-LCD TV series for 2015 are tagged 'UF950T'. The two digits before that for the three models are 79, 65 and 55, representing the TV sizes — yes, 79 inches of giant screen if you wish. And unlike the current premium OLED models, these models are properly flat, which we prefer, since we can see no advantage to curves other than aesthetic preference. Here we run through its paces the middle UF950T model, which is a still impressively large 65-incher.

Equipment

The 65UF950T is a 4K (Ultra High Definition) model, so with the picture defined on its 163.9cm screen by 3840 pixels across and 2160 pixels vertically. The display panel is 60mm thick in the middle of its expanse and down near the base, but wide sections at the side and top (roughly the 200mm closest to the edge) are really, really thin, slightly less than 9mm. It's hard to see how this TV could be edge-lit, or even back-lit by a

full screen array, but LED backlighting is indeed the specified technology in use.

The bezel is also suitably thin — 13mm on the sides and tops. The rear of the TV was finished in white, so a freestanding installation isn't out of the question. The stand was quite wide and fairly low slung, so that the bottom of the TV sits just 50mm above the bench.

The stand has a sloped front that seems to act as an acoustically reflective surface, redirecting sound from the downwards-firing Harman Kardon-designed speakers out into the room.

LG has incorporated into the panel local brightness control. This is called Ultra Luminance Technology. Other features of the display include a 200Hz frame rate, a six-step upscaler, and ColourPrime. The upscaler turns SD and HD material into 4K through a number of defined steps, optimising at each, while ColourPrime combines phosphor-based colours in the panel itself and support for wider colour gamuts. This would appear to be of limited usefulness right now, but word is that the new UHD



The Tweakers' Guide

As is so often the case, some tweaks were required from the default settings of this TV to achieve ideal picture performance.

Based on the 'Standard' picture mode, I'd suggest turning 'Sharpness' to '0' to get rid of an irritating edginess and an emphasis of picture grain. (When I started watching 'The Last Ship' on Blu-ray, it looked like the filmmakers had used the grainiest possible film, until I realised that I still had the sharpness on the default.)

Also, the 'Contrast' control can do with being bumped up from 95 to 99 or 100. At 95 maximum white was a bit below where it should and could be. The black levels were generally good and there was clearly some fairly vague localisation of the backlighting. There was a touch of mottling in dark scenes when watched in a darkened room.

You may or may not want to play with the motion smoothing system, which LG calls TruMotion. The default setting was 'Clear', which markedly reduced judder without producing too glossy a look to the picture, nor too many artefacts. The 'Smooth' setting tilted the balance too far away from the original look and produced far more visible artefacts. 'Clear Plus' seemed to darken the picture. There's also (uniquely to LG, we think) a 'User' setting in which you can adjust separate 'De-Judder' and 'De-Blur' sliders. Tweak away! Overall, I spent most of my time with TruMotion switched off, and just enjoyed the natural clarity of the picture. The occasional instances of judder simply evidenced defective cinematography from the movie makers themselves.

The TV does not support automatic lip sync, so you'll need to set that manually in your home theatre receiver.

Blu-ray format will move beyond (or at least allow for future movement beyond) the limited colour gamut of today's Blu-ray.

The TV supports 3D using the passive system and comes with four pairs of lightweight polarising glasses for use with that. It also supports the 'Dual Play' system which reformats split-screen games into full screen, each visible only by its player. The glasses for these are an extra-cost option.

The TV has four HDMI inputs, all supporting UHD up to 60p, and two supporting HDCP 2.2, which will likely be required for UHD source devices. It also has three USB sockets, one of them USB 3.0, which can be used to plug in a hard drive to record, pause and rewind TV. Since the TV has two tuners, you can watch a different station to the one recording. There's an Ethernet socket or dual-band Wi-Fi to connect with your network, and Bluetooth for pairing with input devices or external loudspeakers.

Last year LG introduced its WebOS Linux-based operating system. This year this has been boosted to version 2.0 and supercharged by the use of a quad-core processor.

As has been LG's habit of late, the TV comes with the Magic Remote Voice (and only the Magic Remote Voice) for remote control. This uses mostly RF communications and controls an on-screen pointer

by detecting movement of the remote. It has been vastly improved this year, mostly since it now incorporates a good selection of keys that were previously not available, including numbers and a set-up key. It also seemed somewhat easier to control the pointer, which was readily brought up on the screen by a quick flick of the scroll wheel. A limited range of voice commands is also available — this isn't quite Siri — and more usefully you can enter words into the web browser for searches.

Performance

The review TV had clearly been well-travelled before arriving with me (it required quite a bit of screen cleaning to make it watchable). It turned out that the remote included with the TV wasn't paired, which would normally be the case. That gave a brief opportunity to discover which keys require the RF connection and which work through IR. It turned out that very few work with IR: just the power and 'Home' keys, it seemed. Anyway, a simple key combo

had the remote looking for and, within seconds, finding the TV.

The WebOS2.0 is rather cutely animated, especially during the first-time start-up wizard. This guided the set-up through all the necessary steps, including network connection. It was fast and non-threatening, and the whole thing was done in under five minutes.

It was very quick to get the picture up on screen by the standards of 4K TVs, requiring only about five or six seconds from standby to a broadcast image. In standard picture mode with frame interpolation motion smoothing on, the delay was around 100 milliseconds, judging from a 1080p/24 sweep test pattern. In Game mode this looked to reduce to around 40 milliseconds. Using a test meter which employs a 1080i/60 test signal, the delays were reported as 120 and 53 milliseconds, probably the more accurate pair of figures.

The quad-core processor is noticeably hotter than those in last year's models, and so WebOS, already nicely usable in its previous version, is now a positive

pleasure. Menus snapped up instantly. Almost never was the 'waiting' icon of rotating marbles hanging around. Access to the smart functions was likewise instantaneous. The WebOS row of icons can be edited by dragging and dropping them. And usability was enhanced by having much of the direct functionality of an old-fashioned remote control now built into the Magic Remote.

Of course, not everything is well integrated. FreeviewPlus, for example, does not benefit from the pointer control, although it looks to be screaming out for it. That said, with the powerful processor built into the TV, FreeviewPlus was highly usable, popping up its previous-days' EPG quickly.

The standard broadcast EPG information was not retained when the TV was switched off, so whenever you switch on you only have EPG entries for the TV station currently tuned in. To see the rest you have to select the other four networks in turn and allow a few seconds for each to load up.

The Smart features include ABC iView and SBS On Demand apps, plus specific apps for Netflix, Bigpond Movies, YouTube, Quickflix, and of course there's a web browser (you can use a Bluetooth or USB keyboard and mouse to make this really effective). There are lots more things available in the LG Content store, mostly for free, including games, more streaming video apps, news resources and so on. The Facebook and Twitter integration that was the rage a couple of years ago is gone. There don't even appear to be apps for social media any more, probably in sensible recognition that people use their more personal smart devices for such things these days.

The network media support was mixed, with good performance on the formats supported, but limitations on the range of formats. Video support was generally very good. Playing a mid-res MKV format movie from NAS was a real pleasure, with virtually instant jumping around on the timeline (using the pointer, of course). Full-HD in a variety of formats was very nearly as effective, just a bit slower in seeking specific spots.

"these models are properly flat, which we prefer, since we can see no advantage to curves other than aesthetics..."

However, while the system played all my 4K source content from USB, it would play none of it streamed over the network, even some LG content from previous years.

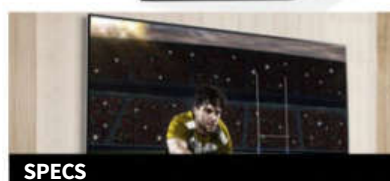
The photo display quality was superb, both from USB and the network. PNG, JPEG and BMP were supported. High resolution images were not run through a 1080p bottleneck, so the maximum possible quality was on offer.

Music in iTunes-style AAC, plus MP3, WMA and OGG is supported. But FLAC and Apple Lossless were not.

We encountered a little HDMI incompatibility with Denon's top-of-the-line AV receiver. The TV often seemed to require the receiver to be switched off and on again to allow a picture to be produced when the input was changed. Initially the problem only seemed apparent on HDMI inputs 1 and 2 (the ones which support HDCP 2.2), but later, after an upgrade to the firmware in place for the bulk of this review, it also appeared on HDMI input 3, to which I'd switched for convenience. There was no such issue with an HDMI amp I also used (this was HDMI 1.4 in capability). As always with these things, it is near impossible to diagnose where the responsibility lay (other than to point our fingers at the ridiculous copy protection schemes).

Conclusion

While this 65-inch LG is no cheapie, it is impressive on any level, and the competitors we've seen suggest that for a substantial improvement over this from some other brand you'd have to pay substantially more. The 65UF950T is clearly LG's best so far at this size, short of going to currently-curved OLED at significantly higher pricing for this size of screen. *Stephen Dawson*



SPECS

LG Electronics 65UF950T \$6499

Firmware: Ver.03.03.45

Display technology: LCD panel, LED backlight, IPS Panel

Screen size: 163.9cm

Native aspect ratio: 16:9

Native resolution: 3,840 x 2,160

Brightness: Not stated

Contrast ratio: Not stated

Inputs: 4 x HDMI, 1 x composite video, 1 x component video, 1 x stereo audio, 3 x USB, 1 x Ethernet, WiFi, 1 x aerial

Outputs: 1 x optical digital audio, 1 x 3.5mm headphone/analogue audio

Audio: 6 speakers, 3-way, 60 watts quoted

Included accessories: Table-top stand, 'Magic' remote control, 4 x 3D glasses, cable adaptors

Energy rating: 5.5 stars, 404kWh per year

Dimensions without/with stand (whd): 1455 x 845 x 60mm/1455 x 896 x 249mm

Weight without/with stand: 33.7/34.8kg

Warranty: One year

Contact: LG Electronics

Telephone: 1800 725 375

Web: www.lg.com.au

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drummer with Living Colour



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- Leather storage wallet with extended range of quality accessories.

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Free & easy

Bowers & Wilkins P5 Wireless

headphones

Small, luxurious and portable — B&W delivers a delightful cable-free compact headphone.



SUMMARY

Bowers & Wilkins P5 Wireless

headphones

Price: \$599.95

- + Solid music sound via Bluetooth
- + Intuitive controls
- + Compact convenience
- Only affordability

It's not hard to make a wish-list for a pair of Bluetooth headphones. We'll put sound quality at the top, as we always do. Then perhaps solidity of connection — today's digital wireless headphones have done away with the swishy noises of old but you still need a headphone that connects easily and doesn't drop out. Comfort, aesthetic design, battery life, and perhaps size might all be on the list — size in convenience terms, easy to store and transport.

Equipment

For all these criteria, Bowers & Wilkins doesn't put a foot (or an ear) wrong with the P5 Wireless. This is a Bluetooth version of the company's little on-ear P5 wired headphone, and we were impressed with B&W's insistence on re-engineering the acoustic enclosure to tweak the sound back to that of the wired P5 rather than merely making compensations via the digital EQ possible available now that there is active amplification within the wireless model. The internal battery is quoted for 17 hours, which seemed borne out in our usage, and charging is via a standard micro-USB socket.

These are on-ear phones, usefully dinky and light at 213g, the headshells folding inward so they slip in the supplied quilted bag with its nice magnetic catch and take up little precious space when transported. As with their wired counterparts there is a sense of refined luxury from the sheep leather used on the headband and earcups, plus the swirling aluminium work which serves to anchor the earcups before disappearing up into the headband, allowing a good 3cm of fit adjustment on each side — the maximum extension enough to accommodate even our big head.

Performance

Controls and Bluetooth pairing were easy and intuitive, powered up by a slider on the right headshell (we had trouble spotting the left-right markings on the anchor studs, but the controls define the right), activating Bluetooth by a further push of this, pairing quickly with our iPod touch and thereafter doing so automatically. The link remained solid nearly all the time with our iPod in top pocket, jeans pocket or bag, though we did experience some drop-outs on the morning bus commute, apparently corresponding to moments of engine acceleration.



We've used plenty of BT headphones where controls are easy to use in error; these are just perfect. A nicely tactile three-position switch on the back edge of the right headshell allows easy control of volume, pause (one press), next track (two presses) and last track (three presses). It also allows call taking and has two mikes and ClearVoice technology built in. With our iPod touch, press and holding activated Siri, which then worked through the mike and headphones; rather fun.

While the headshells are a mere 75 × 55mm, with only a few millimeters in depth added to the wired P5 to include the extra electronics, the nylon-damped diaphragm within is a good 40mm size, and provides solid full-range sound. It's a little less than entirely airy up top (Android users able to employ the aptX Bluetooth codec supported here may gain in that area), but B&W's careful engineering has delivered a balance that prevents this manifesting as a weakness. The midrange is particularly rich and punchy, bass is solidly supported and slightly emphasised without ever overdominating, and crucially we found the music simply poured through. The P5 Wireless held Leonard Cohen's vocal

Feeling fine



NAD VISO HP50 headphones

combination of bass content and treble rasp as a single entity, it delivered the detail and nuances in Weezer & Hayley William's delightful version of 'Rainbow Connection' (one of our emotive testers, hairs successfully raised by both this and Morricone's 'The Mission' soundtrack).

You can use the P5s with a supplied cable if your battery is low — this confused us at first, because there's no visible connection socket on either headshell! But the online manual (B&W prefers to include a full-colour promo for the company in the box rather than a product manual) explains how to pull apart the left headshell in order to insert the cable. It's a bit alarming first time, but entirely reliable and keeps a tight and safe hold on the cable — you can't, however, even connect via Bluetooth until the cable is again removed. This made A-B comparison of the sound a little long-winded, but the cable connection allowed higher playback levels while also opening up the top end for added welcome edge and delight, though also increasing a little too much the emphasis in the upper bass and lower mids. Overall we'd take the wireless balance by preference as well as convenience.

Conclusion

Light, compact, reliable, intuitive, and musical — the B&W P5 wireless is everything a Bluetooth headphone should be. While they're not cheap at \$599.95 (the larger but cable-only over-ear P7 is the same price), the luxury and sound quality are as you would hope for at this level, and their minimal size is a delight for portability. *JF*

SPECS

Bowers & Wilkins P5 Wireless

\$599.95

Type: on-ear closed-back headphones with Bluetooth

Driver size: 40mm

Impedance: 22 ohms

Weight: 213g

Contact: Convoy International

Telephone: 02 9666 0700

Web: www.convoy.com.au

Sharing a stable with PSB Speakers under the Lenbrook Group (which also includes Bluesound) has allowed NAD to co-opt the talented Paul Barton into its headphone design, and to include 'RoomFeel' processing in these impressive and well-priced over-ear headphones. 'RoomFeel' debuted in PSB's M4U 2 active 'phones, a noise-cancelling design by Barton that we recognised twice in the Sound+Image Awards. In those, RoomFeel was an option, switched in and using internal power to add the kind of warmth and openness that results from room reflections when using normal speakers, but which is omitted when delivering direct to your ears.

Here there is no internal power, no charging required, so the 'RoomFeel' is tuned into the HP50s' fundamental response. But the same characteristics are there — a full sound, with plenty of bass but never bloomy or thumpy, open to the top-end but never harsh, and an excellent sense of realism through a rich midrange. There's plenty of level to battle the daily commute, and they push all the way to the top with absolutely minimal distortion creeping in. Indeed their sound quality compares extremely well with other headphones up at the \$500 level with little to count against them — the headshells are straightforward shiny plastic rather than being decked out in exotic materials, but that adds to your confidence when storing them even without the provided carrycase, headshells swivelled flat into a day bag. In comfort terms the headshells do perhaps grip a little too firmly (especially when dropped temporarily around the neck). But those are the only points dropped against designs in the next price bracket up.

There's no wireless connection here, of course, but the cable can go to either headshell (another PSB characteristic), and that can be an exceedingly handy switcheroo to avoid trailing



cable in many situations, from office to bedroom. You get two cable options, both tangle-free flat designs, one plain and one adorned with an Apple-friendly three-button lanyard lozenge including call-taking and Siri-starting functionality.

Conclusion

That slight tightness of fit aside, we have no criticisms to throw at the HP50 — it is a strong performer, with a rich and real sound balance that will delight listeners across multiple genres. We advise auditioning their sound alongside rivals at higher price-points — you may not need to spend more. *JF*

SPECS

NAD VISO HP50

\$399

Type: on-ear closed-back headphones

Driver size: 40mm

Impedance: 32 ohms

Weight: 226g

Contact: Qualifi

Telephone: 03 8542 1111

Web: www.qualifi.com.au

Definitive Technology
Symphony 1

headphones



Def jamming

The debut headphones from Definitive Technology offer multiple abilities and excellent performance.

SUMMARY

Definitive Technology
Symphony 1headphones
Price: \$769

- + Excellent sound by wire, Bluetooth or USB
- + Active noise-cancellation
- + Good and logical controls

- Not a whole lot against

A few years back, when headphones were going bonkers on the back of the Beats revolution, every hi-fi brand under the sun rushed to release its own take on high-end headwear. But not Definitive Technology, which has waited until now, perhaps rounding out its range alongside the delights of its 'W' wireless multiroom offering, or perhaps simply waiting until it had the right product for its discerning users.

Equipment

Certainly the Symphony 1 design jumps in at the deep end — they offer the lot, being over-ear closed headphones that can be used with a cable connection or wirelessly via Bluetooth, plus they're also active noise-cancellers, and have one other trick up their blue-accented sleeves. Even better, they get everything pretty much right, even the tricky task of controlling wireless functionality from the headset itself.

The Symphony is entirely black except for the thick steel extension band and DefTech-blue highlight where this enters the soft headband. Even the small buttons are labelled

in black on black (very Douglas Adams), so that familiarisation is your best friend when learning these controls. They are all on the right headshell, with three buttons beside the charging and cable sockets to power them up, turn on Bluetooth if required (the Symphonys will connect automatically to the last paired device if it's available), and a third button to activate or turn off active noise cancelling.

There are also volume and play/pause buttons very sensibly separated on the side of the earshell (unlike some rivals which are all too easy to power down when trying to adjust volume), and the play/pause has a raised dot for identification. Next/last track control of our iPod touch was usefully possible via Bluetooth by two or three presses of this button, even rewind and fast forwards by a slightly tricky holding after the third/second press. These headphones also allow you to take calls — there's a microphone also in the right headshell.

Performance

For music listening, the Symphony can, in fact, be used in six different modes. You can use the short supplied cable and listen



test headphones

Just a touch of blue where the steel enters the headband — otherwise the Symphony 1s are all black in their solid case, with 3.5mm and USB charging cables supplied.

passively (not powered on), or actively (turned on, somewhat brighter and much louder, conserving power on your device), or actively with noise-cancelling on. Clarity was actually best when used passively, but it does take a bit of juice from a headphone socket to do so (our iPod touch was flat out). Note that the pausing/call-taking headshell buttons don't work when you use a wired connection.

Or you can listen via Bluetooth, with or without noise-cancelling. Unusually the noise cancelling has no dramatic effect on the tonal qualities of the Symphony, just slightly raising the level and blooming the bass, while the noise-cancelling itself is excellent — effective if not class-leading at lower frequencies, and nicely benign, so it doesn't feel like your eyeballs are being sucked out, as can some more severe implementations.

We loved the sound by Bluetooth, the slight brightness of the active circuitry compensating for any softness through the Bluetooth link and delivering a lively, balanced and energetic performance. Their 50mm drivers can deliver low, as witnessed by Neil Young's *Walk With Me* suitably shuddering the skull under its low resonances, they had the

light touch required for the detail in Paul McCartney's *My Valentine*, and they passed the congestion test of kd lang's *The Air that I Breathe*, its tricky layers and rising dynamics remaining smooth and information-rich even during the massed vocal peaks. Bluetooth range was also exceptional; we could move several rooms away from our iPod touch before drop-outs began.

There is a sixth way to use these headphones. The internal battery required for active and Bluetooth use is charged via USB — DefTech quotes 15 hours battery life, or 10 with noise-cancelling engaged. But when connected in this way, via USB to a computer, they will not only charge, they also serve as a USB audio driver, taking a direct digital feed of your computer music and using their internal DAC to play it direct to your ears. For laptop use, say, playing and charging at once is gold, fabulous stuff. You can play from USB using your computer when working, play via Bluetooth from your phone when resting. An attractive hard carrycase is provided for when you're not doing either. (In USB mode the headshell volume buttons controlled system audio on a Mac, though the pause/next didn't seem to do anything.)

Conclusions

Overall they feel just a little less than totally airy; there's a slight feeling of enclosure in their fit. And with noise-cancellation engaged they can exhibit just the teeniest woof on bass guitars. Some might think they look a bit plain in their extreme blackness. But that's all we've got against them — bottom to top, these headphones get it right, including a near-perfect sonic presentation for our preferences. With all the options — wired, wireless, USB, and active noise-cancellation — it really is a Symphony of talents, and one of the few headphone models to which we give a complete recommendation. *JF*



SPECS

Definitive Technology Symphony 1 \$769

Type: over-ear closed-back headphones with active noise-cancellation and Bluetooth

Driver size: 50mm

Impedance: 32 ohms

Warranty: One year

Contact: Advance Audio

Telephone: 02 9561 0799

Web: www.advanceaudio.com.au



**SOUND
IMAGE**

avhub.com.au/
M500

KEF M500 headphones

"KEF's headphone debut has been worth waiting for..."



**SOUND
IMAGE**

avhub.com.au/
Stax2170

Stax 2170 Earspeakers

"we fell in love all over again with the electrostatic headphone concept..."



SUMMARY

JBL Synchros 700

headphones
Price: \$399.95

+ Powerful sound
+ Active LiveStage mode
sounds fabulous
+ Cool carrycase

- Passive sound not
so impressive

Handling the truth

JBL Synchros S700 headphones

With the Synchros S700, JBL invites you to “hear the truth”. But there’s a trick to finding it.

Hear the truth’, it says on the outer packaging. Then inside, large letters declaring — “The sound of what comes next.” So the future, and the truth. Them’s pretty big promises, mister.

Inside the second layer is the carrycase (top, opposite), an object of worship in itself — sleek and soft, it could be a Star Trek-era man bag; we adore it. You hunt for the zip, tucked away inside its whale lips, and then unzip the case to remove the Synchros headphones.

They look a little industrial with their spoked shell enclosures (a little reminiscent of Sennheiser HD424s), and they appear semi-open but of course they are closed designs, designed for street use. The band has 12 marked and ratcheted positions on each side — an excellent way to ensure customised fit with repeatability given the bands must be minimised before returning the headphones to their case. Our large head required maximum

extension, and despite the soft leatherette earcups we found things just a little tight, a tad oppressive especially on warm days.

You get two cables in the base of the box, one for listening, including a small clavicle-level inline remote, and one for charging the S700. Charging? Yes indeed. These aren’t noise-cancellers, but they are active, and charging their internal Lithium-ion battery will allow some 28 hours of what JBL calls ‘LiveStage’ processing, which it says “delivers a more lifelike listening experience like no other headphone today” (sic).

This isn’t merely an EQ tweak — PSB Speakers and NAD do something similar, calling it RoomFeel (see previous review); both this and JBL’s LiveStage aim to add the effect of room reflections you would hear were you listening to speakers rather than headphones. You activate LiveStage on the S700 by pressing and holding the left earpiece; you hear one beep when turning it on, two turning it off.

test headphones



^ Whale lips on a Star Trek manbag — we love the carrycase.

One effect of this active power is to ensure there's plenty of level on tap. With many headphones under the assault of a bus commute we can hit the maximum from our iPod touch and still want more, but never with the JBLs in active mode. They gave plenty and kept some in reserve, and indeed managed this even in passive mode with LiveStage unengaged.

But it's the change in sound balance that is most remarkable. Passively they deliver a slightly boxy midrange and a sound that becomes overwhelmed by a pushed upper bass. If your music is rich in these frequencies, taking the Synchros loud in their passive mode can become a problem, with that low band simply pushed too far and the drivers becoming flabby and lacking in resolution. Rich male speech can become boomy, while Leonard Cohen's resonant vocal on *Going Home* was significantly overplumped.

Press that LiveStage button, however, and things pop into focus. The bass remains powerful but not overegged, the boxiness disappears, and a fine set of headphones are revealed in all their glory. Their closed design precludes an utterly airy treble, but there's no softness, and musical details are kept clear and crisp, the snare in the right channel of kd lang's *The Air That I Breathe* delightfully realistic, lacking just a little air around it. Tom Jones' *In Style and Rhythm* sounded fabulously funky and pumping. But switched back to passive mode, this song's combination of loud bass guitar and thumpy drums was delivered as a wall of bass rather than as differentiated and controlled elements. Engage LiveStage once more and the bass dropped back into balance.

So don't (as we did) lose the charging cable! It is a non-standard design, using the microjack socket on the headphones (so you can't charge and listen at the same time). Only when charged and in LiveStage mode would we recommend the S700, for then JBL really does come close to delivering the truth, or at least JBL's usual slightly larger-than-life interpretation of the truth. *JF*

SPECS

JBL Synchros S700 \$399.95

Type: over-ear headphones

Driver: 50mm driver

Quoted frequency response: 10Hz – 22kHz

Maximum SPL: 117dB @ 30mW

Rated power input: 30mW

Connections: 3.5mm Jack

Contact: Convoy International

Telephone: 02 9666 0700

Web: www.convoy.com.au



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Sennheiser RS 185

wireless headphones



Mobile Homers

Wander your home free from the worry of trailing cables decapitating the cat. Sennheiser's wireless 'phones are a real home helper.

SUMMARY**Sennheiser RS 185**

wireless headphones
Price: \$599

- + Great headphones
- + No sonic penalty for going wireless
- + Control & inputs improved over previous generation
- Open design spills sound

Regular readers may remember us lavishing praise on the predecessors of the RS 185 — we have long been fans of Sennheiser's wireless headphones for the home. These are not Bluetooth models designed to free you up on the daily commute; they are strictly for the home, and use a superior transmission method that doesn't involve data compression during the process. And for once the words on the box speak true — the RS 185 do deliver genuine "hi-fi digital wireless uncompressed sound".

Equipment

The new range replaces a trio of models that were showered with awards following their release few years back — the RS 160, 170 and 180. The new range follows up with the RS 165, 175 and 185, plus an RS 195 model which was originally intended to be released only as a specialist model for audiologists (it enables specific corrections for hearing deficiencies), although this model is now listed on Sennheiser's website with the rest of the range.

There are a great many differences in these next-generation wireless models compared

with the originals. This time all the models come with a headphone stand which has the inputs and transmitter built in (previously the entry-level RS 160 model had only a small separate puck unit for this purpose, which many may have found a little inconvenient). The transmitters can now also service two pairs of headphones each, making his and hers headsets an easier proposition where previously re-pairing would have been necessary.

But the most fundamental difference, perhaps, is a change in the wireless technology itself, moving from the third-party Klear transmission to Sennheiser's own proprietary wireless system. This promises reception up to 100 metres given line of sight — domestic inconveniences such as walls will reduce this, but as we'll see, transmission appears just as strong as the Klear previously used.

For this review we lived with the top of the main range, the RS 185. As with the former RS 180, this is the only open headphone in the group, as opposed to closed. Not so long ago nearly all home headphones were this way — open headshells allow a more airy open sound. But the trend these days is firmly closed, especially with headphones that double up

for duties outside the home, where the spill of sound from open designs is just downright antisocial. The choice of open design at home will depend on whether you intend listening in the same room as others — we were barely through our first song before the missus, focused on some CSI murder, banished us from the sitting room couch and sent us up to the music room to spill our audio in peace.

The control layout on the headphones themselves has evolved — still all on the right headshell, but no longer is the power button situated dangerously between the volume controls; it has been moved to the outer headshell, while on the RS 185s a circle of controls offers volume up and down at the bottom, left and right balance adjustments above that, and a 'Level' button between those. We are delighted by the 'Level' button, as it addresses our main (almost only) criticism of the first generation, which used automatic gain control to achieve the optimum transmission level between base and headset. While this made sense in some ways, it also caused the audio to 'pump' as it transitioned between quiet and loud passages; this was especially noticeable and undesirable with classical music. Now you have the choice — fix the level manually, or let the auto gain to do its thing. We couldn't ask for more.

Performance

Set-up requires nothing much more than loading the supplied AAA battery into each headshell via an easily twisted earcushion removal, and then plugging in your cables to the transmitter base. No 'pairing' operation is required, since the headphones come pre-paired with the transmitter, and in the new generation the base is activated automatically when you power up the headphones, another timesaving bonus.

Connectivity is improved over the first generation as well. The RS 185 transmitter base has both analogue and optical inputs, with a switch between the two on the rear. The optical input is very useful for TV audio — all modern TVs offer an optical output at fixed level (indeed some no longer offer an analogue headphone or line output) and the wireless Sennheisers are ideal for cranking up those action movie soundtracks when everyone else is asleep.

But for music use also, the optical input allows a direct digital input. Given that the transmission between base and headset is digital, we had previously commented that the analogue-only input of the previous generation meant that digital sources had first to be

made analogue, then converted back to digital for transmission — not ideal. Now you can give the Sennheisers the PCM original and, while we're not sure exactly what goes on prior to the wireless transmission stage, there's a high probability that the first digital-to-analogue conversion will take place only at the final stage, in the headphones themselves.

The analogue input uses proper RCA phono sockets, and as mentioned gives the choice of automatic gain control or manual level control, limited first by an input gain control on the transmitter, ideally set as high as possible without audible distortion, after which the volume controls on the headset itself provide your local adjustment. Being finicky, we much preferred the manual method (a red light usefully indicates overload), but the automatic system worked well and is a handy fallback. Be a little careful switching from auto to manual via the headset — it could raise the level dramatically (though Sennheiser incorporates a friendly fade out and in as this happens). Switching between analogue and digital inputs can, of course, cause a sudden jump; Sennheiser correctly warns against this in the full manual (supplied on CD or online), and sensibly doesn't allow this switch to be made from the headphones themselves.

We started our listening with TV-based optical input, and the RS 185s proved very impressive performers with soundtrack material — rich and powerful, crystal clear for dialogue, and notable for a slightly unusual quality, a wide spread of wraparound sound. The main delivery seemed to project from slightly behind our ears — it would still centre effectively, but the result was an almost wraparound quality from the back of our ears to a forehead centre position. We could see no obvious reason for this — with the earcushions removed, the diaphragms are precisely centred; it might possibly be an effect of the cushions themselves, which curve behind the ear but are straight at the front, relatively restricting audio entry from that direction. Results will likely vary according to your particular head. Though slightly distracting at first, this directionality does nothing to detract from longterm listening, nor from the wonderfully musical performance of the RS 185s — as with their predecessors, there is zero penalty in sound quality for your decision to go wireless compared with Sennheiser's highly regarded wired headphones. Indeed if you find the company's mainstream Urbanite and Momentum models slightly soft or emphasised in the bass, you will prefer the balance here — bass is solid but entirely without bloom, and treble vibrant and open; we so rarely spend time with open headphones these days that it was a reminder how much they free the ears from any sense of enclosure. On and on we listened with no hint of tiring our ears, nor was the ultimate level limit of Bluetooth designs apparent here — with the manual level set right on the red clipping light, there was plenty of headroom for special moments or ramping over time.

Range was exceptional too. We still have the previous generation RS 170 in residence, and range here was slightly improved. Don't expect 100 metres

in the real world, but certainly one or two rooms or floors distant is possible. As for battery life, Sennheiser claims 18 hours, but if you always store them on their stand, it's highly unlikely you'll ever drain them.

We never once needed the left-right balance adjustments; they might be useful for someone a little deaf in one ear but there's really no need for these on the earpiece — they are more likely to be used in error than in earnest. The switch between auto and manual (usefully given a raised dot to make finger location easy) was much used, mainly for comparison to decide if there was the lightest of treble drops when switching to auto gain.

Speaking of which, for those preferring a closed-back design, we note that the RS 175 doesn't include the manual/auto option, nor the left-right balance control (no great loss, this), instead offering bass boost and virtual surround modes. The RS 165s have no digital input and also significantly lower range, according to the spec sheets.

Conclusion

Sennheiser maintains its lead in wireless headphones with the marvellous RS 185. The open design limits their use to environments where you will be alone — they spill too much audio to use them in the same room as someone else (if you prefer closed, consider the RS 175 model instead). They combine comfort with excellent sound quality, while offering improved connectivity, range and operation over the previous generation. Unbridled recommendation. *Jez Ford*



SPECS

Sennheiser RS 185 \$599

Type: over-ear open-back wireless headphones with base station

Base station inputs: 1 x optical, 1 x RCA analogue

Quoted battery life: 18 hours

Weight: 310 g (incl. batteries)

Warranty: One year

Contact: Sennheiser Australia

Telephone: 02 9910 6700

Web: www.sennheiser.com.au

Open season

AudioQuest's impressive debut headphones prove to be stunners at home, even if their semi-open design disqualifies them for portable use.

SUMMARY

**AudioQuest
NightHawk**
headphones
Price: \$895

- + Gob-smacking sound
- + Stunning looks
- + Rich, large, deep bass

- Over-extravagant at times
- For the home, not away

Skylar Gray, the impressively monikered designer/engineer of the NightHawk headphones, says that “The act of listening to music through headphones should be a singularly intimate and transcendent experience.” So it’s a surprise he came up with a semi-open design, then, because intimate they’re not. Don’t get us wrong, we love listening to open headphones, but the missus banishes us to another room if we’re at home, and (being born English) we’re simply too considerate to use them at work, or on public transport. The trend in recent years is towards closed designs that keep your sonic intimacy within the headphones. But AudioQuest is clearly going for performance over portability.

Equipment

It’s a pity, in a way, because the NightHawks would make darned impressive headwear on the bus commute! They look simply stunning, and AudioQuest has obviously not rushed into its first pair of headphones, bringing together all kinds of tech and patented ideas here. These include earcups made of “liquid wood” — a wood and fibre-pulp combo that can be injection molded with unique patterns resulting on every unit. The earpads are made of a soft protein leather, sometimes called pleather, which can be (depending on its

manufacture) more durable and more easily cleaned than actual leather.

The NightHawk’s 50mm driver is more like a loudspeaker cone than your usual headphone diaphragm, being a biocellulose diaphragm conventionally excited (i.e. not electrostatic or planar magnetic) and using a compliant rubber surround. A patented split-gap motor design claims to dramatically reduce intermodulation distortion.

That ‘grille’ you can see in the circular opening which allows the semi-open design to breathe is a 3D-printed diamond cubic latticework “inspired by the underlying structure of butterfly wings” no less, but used here to diffuse sound and defeat resonances. It’s not the first 3D printed component we’ve seen in a headphone (MrSpeakers’ Alpha Dog had one, reviewed June/July 2014), but AudioQuest is no doubt correct in calling this “the first completely original production headphone to use a 3D-printed part”.

Performance

Enough of the clever stuff, what of the sound? Our comments are confined to use of the NightHawks in the home, in a private room, and using the thicker of the two cables supplied by AudioQuest.

We left them playing to themselves for 72 hours before trying them on... they are

exceedingly comfy to wear, though we find we made no notes at all about the fit simply because we were gobsmacked by the performance. 'OMG', we wrote, 'the bass is extraordinarily big deep and rich... wow, stopping reviewing now'. Which meant we were enjoying them so much that we came off the reviewing clock and just listened for several hours, seeing how they delivered track after track with wild exuberance and thrilling results. Are they just missing a slight sparkle in the upper mids/lower treble? Perhaps. They certainly present an intoxicatingly big picture of reality at the bottom and the top. One of our standard semi-open references is the AKG K242HD, a brilliantly neutral design from five years ago. Going from the NightHawks to those, the AKGs sounded flat and dull, far less involving, if perhaps ultimately less tiring. Transients through the NightHawks could kick almost painfully hard, ride cymbals and hi-hats could sound tinnied up and insistent (Bjork's 'Come To Me' delivered one clear example of this). Also they rewarded a high-quality headphone amplifier while sounding somewhat less dynamic from a mobile device's headphone socket. We were transported by the sheer joy of many tracks through these headphones.

And boy, can they go loud — there seems no upper zone where distortion creeps in. Full up, no problem, still bouncing away, still dynamic, still clear.

Conclusion

The AudioQuest NightHawks are awesome. They may not be 100% neutral — we wouldn't, say, mix an album on them. And being semi-open restricts their use (assuming you care). But there is an inherent safety barrier in being awesome, an immunity to criticism. We absolutely loved the NightHawks. They don't tick all the boxes, but frack, sometimes you can do better than that. You simply must hear (and see) the NightHawks' version of reality before buying home headphones at this price level. *JF*

SPECS

AudioQuest NightHawk

\$895

Type: over-ear semi-open headphones

Driver size: 50mm

Impedance: 25 ohms

Weight: 346g

Contact: Amber Technology

Telephone: 1800 251 367

Web: www.ambertech.com.au



Ear Sphears

Focal Sphears

in-ear headphones

We've been impressed with Focal's forays into over-ear headphones, enough so to pause our general moratorium on in-ear reviews and shove the new Sphears down our delicate ears. It is the company's first design to be inserted in this way, and to assist fit and comfort the Sphears come with the usual selection of three silicone tips and three of memory foam to adapt to the wide variability of ear canals.

They're pretty things, and the construction is solid, with 10.8mm Mylar diaphragms (the smallest transducer Focal has ever manufactured, it notes) in a bass reflex enclosure which ports to the outside through a stainless steel grille and ring at the outside. This therefore leaves the 'phones a little open rather than utterly sealed, good for releasing pressure down in the ear canal at the cost of yielding a slight sound spill, likely not enough to enrage those seated beside you on the morning bus.

The Sphears impressed with good dynamic range and with their solidity and level of bass, which also displayed good detail. Neil Young's 'Walk With Me' did have the very deepest of its content (down in the 30s of hertz) dropped, but things certainly resonated nicely, and the Sphears' slight boost of upper bass supports the overall delivery without having the overdominance of 'street'-style designs. At the other end there's plenty of top — spoken voice could get a bit spitty or sibilant, but on the whole Focal seems to have kept this well balanced and safe enough that it never takes your ears off. Indeed if there's a gap anywhere, it's in a somewhat laid-back midrange, so that Leonard Cohen's vocal on recently recorded albums was replayed with the bass below and a crisp and not imposing amount of top, but just a little softness in the middle. Likewise Dion's 'I Read it (in the Rolling Stone)' went down and up without meeting fully in the middle. Otherwise we enjoyed

the Sphears' overall natural tonality, a thoroughly satisfying listen both directly plugged into our test iPod touch and iPhone, and via a good quality dedicated headphone amplifier.

As is *de rigeur* with a modern in-ear phone the Sphear comes fitted with a microphone and multi-function (but single-button) in-line remote that enables users to make telephone calls (answer call, end call) as well as offering play functions (play, stop, next/previous track).

Conclusion

With very little to knock sonically (as you'd hope from Focal), and more comfort than most, the Sphears proved their merits for the \$220 asking price. *JF/EK*



SPECS

Focal Sphears

\$220

Type: in-ear headphones

Driver size: 10.8mm

Impedance: 16 ohms

Weight: 15g

Contact: N.A. Distributors

Telephone: 02 8005 0670

Web: www.nadist.com.au



Luxe français

Hand-assembled in France, Aedle's first headphone proved nearly but not quite a classic...

A small metal plaque inside the luxurious packaging of the even more luxurious VK-1s announces that they were “assembled in Brittany, France”, lest you were thinking there was a Norse or German company involved through the Valkyrian reference. *Mais non*, these come from a Paris-based audio start-up company “specialized in the design and manufacturing of high-end nomadic audio products”.

They certainly approached this, their first product, with lofty ideals, individually numbering each unit on that metal plaque, and using custom-made transducers that have titanium diaphragms and neodymium magnets, housed in a headshell of aircraft-grade aluminium, with handstitched lambskin leather headband and earpads. Even the carrybag is quilted and magnetically sealed. Coo. People on the bus just stare at them.

The opening page of the instructions book is a bit alarming, advising that if they feel a bit tight (which they did), you should bend the manganese steel

headband “to soften and spread the headband permanently”. So we did that, with some effect — we just hope the next reviewer in line to get these doesn’t have a small head. You can also adjust for height not by extending the headband, but by lengthening the tubes into the headshells — another unique touch.

Thus adjusted, the pads are very thin — the diaphragms sit very close to your ears and there is not the luxurious padded comfort you might expect from such a pricey design. There is some method in the madness — it’s more like listening to a loudspeaker near-field. The intensity is quite remarkable and we listened at much lower levels than is usual for us, all that was needed to receive the full picture of information.

At higher levels we found the bass intrusive — the common push of emphasis around 100Hz, which the VK-1s don’t really need. Above that all was creamy and rich, not tamed but smooth in the treble, with good clarity to vocals male and female. There was also an unusual level of front-to-back soundstaging for a pair of headphones — a real ability to isolate instruments in their positions both across the head and in layers within those positions.

So they’re doing something right, though we never quite came to terms with the bass; a little less of that might also grant a little more speed and definition in the lower frequencies, and would make these more enticing headphones in every way. Even upping the power

by adding the provided adaptor plug (an airline plug is also included) and plugging into our Lehmannaudio BlackCube headphone amp didn’t help here; indeed it made the bass slightly more dominant.

Out on the street, with a bit of background road noise, the rumble of a bus commute or the background roar of a jet, the bass emphasis makes more sense — it overcomes other distractions and restored some balance to the Aedles. The bass still stood proud even on early digital recordings — we’ve never heard the opening of Joe Jackson’s ‘It’s Different For Girls’ come through so full and tight. While on road use, we should note there are no controls or mike on the supplied cable, though the manual does mention there is an option available.

Spectacular class from the Frenchies: the VK-1 is also available in classic (black) and Carbon (very black) versions. We hope further offerings will settle the balance and soften the touch to tantalise our ears even more. *JF*

SPECS

Aedle VK-1 Valkyrie Classic \$599

Type: on-ear closed-back headphones

Driver size: 40mm

Impedance: 22 ohms

Weight: 215g

Contact: Interdyn

Telephone: 03 9426 3600

Web: www.interdyn.com.au



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On the Fly

These high-tech Australian-designed in-ear monitors come from a team with musical roots. It shows.

Right at the top of Audiofly's 'Performance' series sit these AF180 in-ear monitors. That word 'monitor' is generally applied to the kind of in-ear 'phones used on stage by jobbing musicians — as backed up here by the company noting that the AF180s are "Designed in Australia by musicians" and that the twisted Audioflex SL cables are "roadworthy and built for the stage". Not that this is necessarily a good thing for those on the daily commute — the criteria for stagework versus public transport are significantly different. For example, the AF180s come without an inline remote (unless you order the optional \$50 CT cable).

First up, then, fit. Getting this right is vital — two of our reviewers originally rejected these in-ears as almost entirely lacking in bass,

having not got the fit right. It doesn't help that the cables are able to revolve (and disconnect if required) from the earpieces, multiplying the possible fit variations. Only when we got the right Comply memory-foam eartip AND stood in front of a mirror carefully duplicating the over-ear loop orientation shown in the pictures did everything leap to life. We rushed back into the office with the good news.

Because worn correctly (duh) they are sensationally good. For starters, with the Comply tips inserted and expanding to fill your ear-canal the isolation is near total — we could barely hear our office colleagues talking at the next desk. This together with the sensitivity, quoted at 108dB at 1kHz, allows very high levels of playback even from a mobile device (so do listen with a little consideration for your own longterm hearing).

And the sound balance — spoken voice was impeccably accurate, not a hint of spit or thinness or overplumming, just perfectly delivering the tone of different microphones and voices. Music was as well-balanced as we've ever heard from a pair of in-ears, much less a quad balanced-armature design like this, where the sound comes not from a conventionally-excited diaphragm but from four mini diaphragms driven by cranks shafts from rods rotating in a magnetic field under the influence of the electrical signal.

We've heard some shockingly harsh balanced armature designs in our time — fast as lightning, but shrill with it. Here the speed remains a virtue, especially dynamic when delivering the impact of stop-on-a-sixpence bass... we've never heard John Bonham's bass pedal slam home with the impact delivered here at the start of 'Walter's Walk'. As with the spoken voice, sung vocals are delivered beautifully, precisely as mixed, thanks to a vibrant midrange, while the top-end is all there, never delivered to excess, so that overall there is simply nothing to distract. What you hear is the music, not a collection of sonic elements, some right, some wrong.

We have in recent years stopped reviewing in-ears at *Sound+Image* (for several reasons). We accepted these from Audiofly because a new over-ear model had been delayed. We're delighted that we did so, despite fears from our past experiences with balanced armatures. Excuses for these in the past have included that isolation is so important to balanced armature sound, bass especially, that custom fitting (using a mould of your ear canal) is the only way to get the best. Well, we reckon you'd be hard-pressed to achieve better than the delivery from the AF180s with a Comply tip. They're not cheap, but they're well presented (nice carrycase, below), and they sound quite superb. *JF*



SPECS

Audiofly AF180

\$549.95

Type: in-ear monitors

Drivers: 4 x balanced armature + crossover

Impedance: 18 ohms

Contact: Audiofly

Web: www.audiofly.com

Blue-sky listening

Where are the Smart Amps? In an era when your smartphone can do anything, Derek Powell asks why our video and hi-fi equipment remains so resolutely stupid.

Frankly, I think that it is about time that audio and video components got a lot smarter. Last issue we discussed the relentless rise and rise of smartphones as the go-to entertainment centre and speculated that if things continued, the hi-fi and video industry as we know it might disappear altogether — with speakers and screens supplanted by earbuds and goggles.

So what can be done to prevent 'mediocre-fi' taking over? Given the inexorable economics of scale, we could easily see the hi-fi sector relegated to a mere cottage industry producing only unaffordable and esoteric valve amplifiers in polished hardwood cases.

I think it's time the audio-visual industry took on the IT-driven smartphone mafia and started offering properly smart speakers, smart amps and smart screens that will blow the earbuds off 'gen-iPhone'. There are some tiny sparks of innovation in the gloom, so let's take a look at where we are — and imagine where we could be...

Three fronts

It seems we can identify at least three battlefronts in the smart war — connectivity, quality and versatility. Certainly both TV makers and hi-fi vendors have belatedly taken up the connectivity challenge by adding Wi-Fi and Bluetooth to key products, and are now starting to hold their own in that campaign. But clever technology can go a lot further in the quality stakes.

Right now a 'smart' hi-fi or home theatre amp and speaker system is one that can run through a little routine of test tones that works out whether you have "large" or "small" speakers. I don't mean to disparage the idea, but isn't it time we went a little further? For decades, PCs have used the EDID system, which effectively feeds back to the video driver quite a lot of information about the capabilities of a screen every



time it connects. Why can't our speakers do that every time they connect to an amplifier? Texas Instruments have a chipset for a 'smart amp' that uses a close analysis of the speaker it is powering to tailor the amplifier's output so it can safely and accurately drive the speaker right to the limits of its capabilities. Right now, that system is used to provide astonishing bang for the buck from small systems like laptop, tablet and phone speakers, but the potential for such a smart system is much wider — as companies like Linn and Devialet are beginning to prove, with speaker matching systems tailoring amp output to the precise characteristics of particular models.

Going further, why don't hi-fi systems have a proper closed-loop feedback system (perhaps with transducers on speaker cones — an idea used by Sennheiser in the 1960s) that allows the amplifier to squeeze the best sound available from every speaker? Granted, that would mean having manufacturers that see themselves as dedicated loudspeaker craftspeople actually put their heads together with amplifier specialists, but these are exactly the tactics that are seeing the digital brigade power ahead. There are a few more IT-derived ideas worth copying too.

Beyond the core

One of the reasons that smartphones have become so phenomenally versatile and successful was the inclusion of hardware that had little to do with the 'core functionalities' of email, text, and web access or voice communication. The addition of accelerometers, gyroscopes, proximity sensors, GPS and over-specified processors cost relatively few dollars, yet have added enormously to the usability and desirability of these devices.

Let's imagine that wireless speakers incorporated smart-phone sensors. Surely if we had speakers that could analyse where they were in a room and where they were in relation to other speakers and screens, then we could make a truly 'smart' and self-organising multichannel sound system. Processor and sensor equipped wireless speakers could make the best of wherever they were placed and

"Maybe soon, if you think that a song might sound better with a saxophone part, there'll be an app for that..."

communicate with the smart amp to provide the optimum listening experience for stereo, 2.1, 5.1, 7.1 or more. The concept of making intelligent use of available audio resources is one of the key principles behind Dolby Atmos, so it's high time that these approaches were applied more widely to hi-fi hardware.

Blue-sky listening

If we accept that digital processing and sensors are now quite cheap, there seems to be no reason why smarter technology can't be used to improve the quality of our audio systems. So let's turn our attention back to the skirmish around versatility.

It's tempting to believe that, more than 125 years after the invention of the phonograph, there are no new ways to listen to music. However there is much more "blue sky" to the idea of smart hi-fi.

More than a decade ago, a consortium of European researchers and electronics manufacturers (including Sony, Native Instruments and the Fraunhofer Institute) put together a report (tediously titled Semantic HiFi) imagining how future hi-fi systems might offer users new functions. A number of ideas in the report, such as identifying a piece of music by humming the opening few notes, and automated playlists generated by the users' own preferences, are already realities — mostly as cloud-based services. But there were plenty more.

Their research, undertaken at the dawn of the digital download era and well before the first iPhone, imagined that users would be able to "interact with music, blurring the traditional limits between playing, performing and remixing". They speculated that future hi-fi systems "will be as much open instruments as listening stations".

Some of the other ideas from the research project included "browsing within musical pieces through the analysis of their content: temporal maps, browsing by lyrics" and "navigation within the orchestral polyphony with spatial audio rendering", which again sounds very similar to the way 'audio objects' are used within Atmos encoding. Maybe soon, if you suggest to your mate that a song might be better with a saxophone part or a different tempo, they might respond: "Well let's try it out on my new hi-fi — there's an app for that!"

There's plenty of crossover here between hi-fi, music production, DJing, and more — but hey, as our Editor has previously noted, there's a Hi-Fi Revolution going on and things are bound to get mixed up quite a bit.

There's every chance, of course, that many of these new ideas can and will be adapted as software for smartphones and tablets. But if you take a look at the devices that Native Instruments (part of the original Semantic HiFi research team) produce, you will see that well-crafted hardware is well to the fore in enabling very tactile interaction with the music.

The traditional hi-fi manufacturers produce great hardware, but if they see themselves as producing only the purest musical experience from single-purpose stand-alone devices (the mythical "straight wire with gain" perhaps), are they at risk of disappearing altogether? You can't cram into a tablet the musicality and quality of true hi-fi components. But I believe we can and should add versatility, usability and adaptability to our finest and most musical hi-fi components by building smarter speakers and amps. *Derek Powell*



Native Instruments (pictured) and other companies have revolutionised the making of music with app-based or software-led synthesisers and work stations that operate at a high quality level. But where's the deep innovation at the playback end of the chain?

blu-rays

Z Nation SEASON ONE



2014 – Reel DVD



In most Blu-ray reviews I'm pretty positive about the actual content. Since space is limited, I choose the best stuff. So I was conflicted when the press release for 'Z Nation' popped into my email box. IMDB tells us that its average rating is just 6.3/10. By comparison, 'The Walking Dead' — which has got so much better in recent seasons — is rated at 8.7/10.

Comparisons are appropriate. 'Z Nation' is in essentially the same universe as *TWD*, and makes a glancing reference to it. With a 6.3 rating, it must be weak, no?

But I took a chance and watched it, and had to wonder how that 6.3 rating

was achieved. The voting breakdown on IMDB is 23.1% 10/10. Nearly 40% of voters give it 7, 8 or 9/10. But at the low end, over 16% give it 1, 2 or 3.

How to reconcile this? After the first episode I remarked to someone that I wasn't quite sure if some of the acting and dialogue were second rate, or cleverly winking at the audience. By the time I got to the end, I'd settled on the latter. It's self aware, and hints that unlike most zombie shows, the characters are aware of zombie fiction. One of the characters keeps noting that zombies' goal is to eat brains, even though all the zombie dining that we see is of just about everything except brains.

For the most part this story — which follows a band of survivors tasked with escorting the carrier of a semi-successful zombie vaccine, guided by the last survivor of an Arctic NSA listening post — isn't especially challenging. They have fun with some of the zombie killing (perhaps that's why the Australian rating is R, or perhaps it's the baby). For a while it looked as though the core group would be left intact, unlike *TWD* in which the main cast is regularly picked off. When it does come, it's a genuine surprise. There's also an element of the randomness of death that's quite striking.

The characters are mostly a little bland, except for Murphy, the vaccinated one. After the first couple of episodes, what he's going to do next is at any time always uncertain, and there's no reason



to think it won't be evil, but whatever it is he will be completely nonchalant about it. One episode deals with revealing past trauma of a character in a very interesting way through dreams within dreams, leading to an unexceptional denouement.

It turns out that 'Z Nation' was the Syfy channel's most popular series in 2014 by a significant margin, and massively so in the 18-49 demographic category. So of course it was renewed for a second season. I have to say, getting everyone — anyone, even — out of the cliffhanger in which they're left at the end of Season One is going to be quite a script-writing challenge.

The picture is presented with great sharpness. Red Epic cameras were used, which offer a resolution of up to 5K. The image has a slightly stretched contrast and considerable colour desaturation that adds to the gritty feel. All the episodes are squeezed onto two discs. The first gets eight episodes with video bitrates at around

17Mbps, while the other six get 16Mbps on the second disc.

That disc also bears a bit over 50 minutes of full-HD extras, mostly featurettes, but also a trailer, a gag (bloopers) reel and 'Zombie Kill' reel (just in case you don't see enough in the episodes themselves). Tech talk for a second — all Blu-ray programs are played via a playlist. The playlist in turn references physical *.m2ts files in the BDMV\STREAM folder on the disc. Typically a video program's playlist will reference one or more of these files, with the main content in its own unique file. But that need not be the case. Disc 2 of this pack has all the special extras contained in just one file (00017.M2TS)

while the separate playlists for each featurette, etc, reference just a section of the file. Blu-rays are extremely flexible.

The 16-bit DTS-HD Master Audio sound quality on this Blu-ray is fine without being outstanding, since this is a TV show, so the dynamics have to be constrained to work with TV sets. There's some surround, too, but not all that much. Dialogue is clear, which is good because most of Murphy's lines are well worth hearing.

SPECS

Z NATION SEASON ONE

MOVIE: ★★★★★ **PICTURE:** ★★★★★

SOUND: ★★★★★ **EXTRAS:** ★★★★★

CREATED BY: Karl Schaefer/Craig Engler

STARRING: Kellita Smith, Keith Allan, Russell Hodgkinson, Pisay Pao, Nat Zang, DJ Qualls, Anastasia Baranova, Michael Welch, Tom Everett Scott

RUNNING TIME: 556 minutes

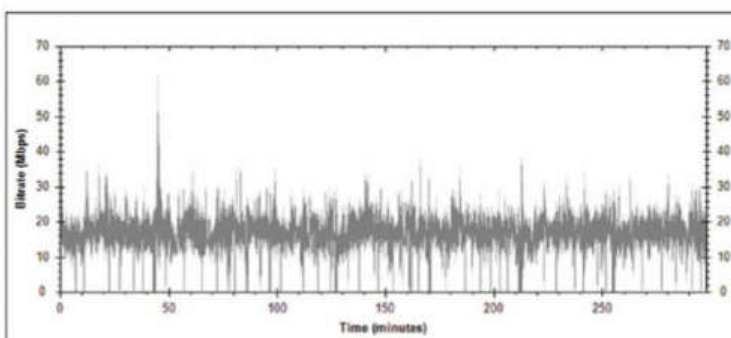
PICTURE: 1.78:1, 1080p/24, MPEG4 AVC @ 17.02Mbps/16.05Mbps (Episodes 1-7/8-13)

SOUND: English: DTS-HD Master Audio 16/48 3/2.1 @ 2511kbps/2483kbps (Episodes 1-7/8-13) (core: DTS 16/48 3/2.1 @ 1509kbps)

SUBTITLES: English

EXTRAS: 5 Featurettes (1080p/24 - 39 mins); Trailer (1080p/24 - 3 mins); Zombie Kill Reel (1080p/24 - 5 mins); Gag Reel (1080p/24 - 5 mins)

RESTRICTIONS: Rated R, Locked to Region B



Video bit-rate for 'Z Nation' Season One (Episodes 1 to 7 shown)

LOUDSPEAKERS

WELCOME

Our buying guide is based on the Sound+Image Awards we present each year – the very best value at each price level. We list all still-available products, varying categories each issue. This time we have speakers (stereo, wireless, packs and bars), plus AV receivers and, for the first time, amps.

Loudspeakers

B&W 685 S2



Every model listed here has won a Sound+Image award – they represent the height of loudspeakerdom and each offers top-value performance at its price, whether low or high! A '✓' means you can read our review on AVHub.com.au. Different finishes can change the pricing, so check with the dealer.

Make and model	Price	Award	AVHub	Website	
Xavian Bonbonus	\$499	HC 2014	✓	www.finallink.com.au	The first 'low-cost' Xavian is a great success – a solid small package with plenty of colour options!
Q Acoustics Concept 20	\$929	HC 2015	✓	www.westan.com.au	Amazing results from usefully compact standmounters; their optional matching stands are \$729.
B&W 685 S2	\$999	W 2015	✓	www.convoy.com.au	Hugely engaging and musical, they performed above many speakers at double the price.
Focal Chorus 706	\$1,050	HC 2015	✓	www.nadist.com.au	Classic cabinet design (gorgeous walnut veneer) yields superb imaging and highs, glorious mids.
Krix Acoustix Mk2	\$1,195	W 2015		www.krix.com.au	Three-driver two-way standmounts that sound like floorstanders with outstanding soundstaging.
KEF X300A	\$1,249	W 2014		www.advanceaudio.com.au	KEF shows how USB computer audio should be done. Also in a wireless version at \$1599.
GoldenEar Technology Aon 3	\$1,645	HC 2014	✓	www.kedcorp.com.au	Strangely-shaped standmounters combining active and passive drivers to great effect.
Krix Phoenix mk2	\$1,795	W 2014	✓	www.krix.com.au	Usefully small floorstanders with a really big sound, amazingly lucid and highly accurate.
Krix Epix	\$1,995	W 2015		www.krix.com.au	In-wall speakers (price is per speaker) we are happy to recommend, based on Krix's Neuphonix.
Orpheus Apollo V1	\$2,000	HC 2012	✓	www.orpheusaudio.com.au	Beautifully crafted, delivering fast and tight bass, smooth midrange and extended treble.
KEF LS 50	\$2,299	W 2013	✓	www.advanceaudio.com.au	Inspired by the classic LS3/5A, exemplary build and sonics combine in this superb speaker.
Whatmough P28-SE	\$2,699	W 2012		www.whatmoughaudio.com.au	The DNA of the P33i but at high value, floorstanders a class above their price (varies with finish).
Equinox Eclipse	\$2,900	HC 2013	✓	www.equinoxaudio.com.au	The handcrafted Eclipse sounds ultrasmooth and uncoloured, with extended highs, natural lows.
Sonus faber Venere 2.5	\$3,799	HC 2014		www.synergiaudio.com	Italian design with Chinese build - great value and exciting presentation from these stunners.
Aaron HMF-600MkII	\$4,499	HC 2011	✓	www.aaronhifi.com.au	Hume L'Estrange's Hyperboloid marvels MkII, deep extended bass, superb mids and highs.
Jamo C 109	\$5,690	HC 2015		www.qualifi.com.au	The flagship of the Concert Series from now Klipsch-owned Jamo, exciting and highly dynamic.
Atlantic Technology AT-1	\$5,900	HC 2012	✓	www.networkav.com.au	H-PAS technology for powerful bass, extended highs plus an articulate midrange – great speakers.
Yamaha Soavo NS-F901	\$5,999	W 2015		au.yamaha.com	Glossed like their pianos and equally musical, the Soavos sound realistic, detailed and musical.
JBL 4429 Studio Monitor	\$7,999	HC 2013	✓	www.convoy.com.au	Stunning studio-style sound with power and dynamics – one of our longterm reference designs.
Sonance Landscape Series	\$8,000	W 2012		www.ambertech.com.au	Outdoor garden speakers with clever sub-sat system for even coverage. Price varies with set-up.
Whatmough P33i Signature	\$9,500	HC 2012		www.whatmoughaudio.com.au	Slim but tall, surprisingly heavy, and superbly balanced performance. Price varies with finish.
Sony SS-NA2ES	\$9,999	W 2014	✓	www.sony.com.au	Sony surprised many by taking our top 2014 award for these sophisticated, sweet floorstanders.
MartinLogan Ethos	\$9,999	W 2012	✓	www.audioactive.com.au	Effortless electrostatic sound supported by conventional bass drivers. Lovely; sound the gong.
Audio Physic Virgo 25 plus+	\$19,400	HC 2015		www.radianceav.com.au	An outstanding 25th anniversary design, tonally accurate and detailed. Price varies with finish.
Vivid Audio B1	\$19,900	HC 2013	✓	www.avation.com.au	One-piece with its stand, the B1 is artwork and speaker combined, expertly voiced and refined.
B&W 802 Diamond	\$21,000	W 2013	✓	www.convoy.com.au	Magnificent – the Abbey Road references are an utterly musical and thrillingly smooth listen.
Whatmough Signature Progeny	\$28,000	HC 2015	✓	www.whatmoughaudio.com.au	Descendent of Whatmough's ultimate Paragon, revelatory resolution and huge delivery.
Dynaudio Confidence C4	\$31,999	HC 2011	✓	www.dynaudio.com/au	Immaculate build & design, superb sound commensurate with their high-end aspirations.
Vivid Audio GIYA G3	\$45,000	W 2014	✓	www.avation.com.au	We gave a special Judges' Choice award for Laurence Dickie's sonic sculptures, a genuine classic.
Wilson Audio Sasha Series-2	\$51,795	HC 2015	✓	www.advanceaudio.com.au	Profound frequency-wide impact with an immersive soundfield, Wilson improves a classic.
Wilson Audio Alexia	\$79,295	W 2014	✓	www.advanceaudio.com.au	Heroic construction and mystery compounds, delivering music beyond all expectations.
Kyron Audio Kronos	\$82,225	W 2015		www.kyron.com.au	Our speakers of the year, Best Sound in Show – world-class Australian system speakers.
TAD Reference One	\$88,000	HC 2014		www.pioneer.com.au	Pioneer's 'Formula 1 racing division', their Reference Series flagships did not disappoint.



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marantz

DENON

AVIDHIFI

WIRELESS SPEAKERS / AV PROJECTORS

Wireless speakers

Focal XS Book Wireless



One of the most active categories of recent years, wireless speakers can use Bluetooth, AirPlay or DLNA, or can even form part of a coordinated multiroom system (like those reviewed in-depth in this issue). All the models below have won Sound+Image Awards.

Make and model	Price	Award	AVHub	Website	
Bose SoundLink Mini II	\$249	HC 2014	✓	www.bose.com.au	Bose's Bluetooth speaker now in MKII form, a sweet-spot of sound and size.
Pure Jongo T6	\$399	HC 2015		www.pure.com.au	The largest of the Pure Jongo multiroom speakers – pair them in stereo for a truly massive sound.
Bose SoundTouch Portable	\$499	HC 2015		www.bose.com.au	Now with SoundTouch Series II software, Bose's portable player is one of its good 'uns.
AktiMate Micro B	\$549	W 2015	✓	www.aktimate.com.au	Triple award winner (also HC 2014, W 2012), the Bluetooth/USB Micro B is a great desktop pair.
Focal XS Book Wireless	\$549	W 2015	✓	www.nadist.com.au	Wireless units rarely create good stereo – the Focals are an exception, using two connected units.
Philips M1X-DJ	\$550	HC 2015	✓	www.philips.com.au	Designed with Armin van Buuren, using djay 2 app for desk dancing or Bluetooth for streaming.
B&W Zeppelin Air LCM	\$600	W 2012		www.convoy.com.au	The Zeppelin AirPlay/dock design still sounds great with LCM tag, and is better value than ever.
HEOS 5	\$649	W 2015	✓	www.heosbydenon.com/au	The middle of three wireless multiroom speaker units in the HEOS by Denon ecosystem.
Sonos Play:5	\$649	HC 2011		www.sonos.com	A stunning speaker unit when launched, now under siege from the new multiroom systems.
NAD Viso 1	\$899	W 2013	✓	www.nad.com.au	Slightly weird but making a lovely big sound, combining Bluetooth with a physical iPhone dock.
Loewe AirSpeaker	\$999	W 2013		www.loewe.tv/au	Stylish and colour coordinated, the AirPlay-equipped Loewe proved a sophisticated performer.
AktiMate Blue	\$1,095	HC 2014	✓	www.aktimate.com.au	Large active speakers with Bluetooth, USB and other inputs – almost a full system solution.
B&W A7	\$1,300	W 2014		www.convoy.com.au	B&W's wireless units are sophisticated in every way and make beautiful room-filling music.
KEF X300A	\$1,249	W 2014		www.advanceaudio.com.au	KEF shows how USB computer audio should be done. Also in a wireless version at \$1599.
JBL Authentics L16	\$1,999	W 2015	✓	www.convoy.com.au	The size and 70s' styling may not be for everyone, but one of the best standalone speakers ever.
Cabasse Stream 3	\$2299	HC 2014		www.avrevolution.com.au	Clever and musical 2.1 sub-sat system with Cabasse's mini spheres, DLNA and Bluetooth.
Geneva Sound System Model XS	\$299*	HC 2013		www.audiodynamics.com.au	*The dinkiest of Geneva's sound systems, part clock-radio, part portable wireless speaker.
Accent Digital Muse	\$349*	HC 2014		www.ambertech.com.au	*Not the prettiest unit in the world but exceptional value given the size and sound at the price.
Pioneer XW-SMA3	\$499*	HC 2013		www.powermove.com.au	*Pioneer's first release of wireless speakers were plain but offered good sound for the price
Geneva S DAB+	\$699*	W 2011		www.audiodynamics.com.au	*A lovely gloss-finished tabletop speaker with Bluetooth streaming and DAB+/FM radio.
AktiMate Mini+ B	\$795*	HC 2013		www.aktimate.com.au	*Now updated with Bluetooth and retaining our recommendation for its superb performance.
Dynaudio Xeo 3	\$2,349*	HC 2013		www.dynaudio.com/au	*We loved the sound quality of these original Xeos, now coming in a new "revolutionary" form!

AV projectors

Runco QuantumColor Q-750i



TVs are getting bigger, but projection is still the way for a truly bigscreen experience at home. Projection at 4K is still a rarity and comes at a price, but for 1080p there are some stunning projectors at high-value prices. Don't forget to invest in a decent screen!

Make and model	Price	Award	AVHub	Website	
Epson EH-TW9200W	\$3,999	W 2015		www.epson.com.au	Built-in wireless to avoid HDMI runs, plus wonderfully bright and bold performance.
Sharp XV-30000	\$4,999	W 2013	✓	www.sharp.net.au	Sharp's great 2D performance and fantastic DLP crosstalk-free 3D impressed us.
Sony VPL-VW500ES	\$13,999	W 2015	✓	www.sony.com.au	Sony continues its 4K projection dominance. We love the subsequent VW300ES as well.
Runco QuantumColor Q-750i	\$25,500	HC 2011	✓	www.networkav.com.au	New lamp technology – RGB InfiniLight LEDs – for long-lasting Runco wonderfulness.
BenQ W1080ST AV projector	\$1,499*	HC 2014		www.benq.com.au	*Excellent value short-throw projector, now updated in its + version.
BenQ W7500	\$3,499*	HC 2015		www.benq.com.au	*BenQ proved it could do more than entry-level - and exceptional 3D from this projector.
Sony VPL-VW1000ES AV projector	\$25,999*	W 2014	✓	www.sony.com.au	*Superseded by the VW1100 ES, this was the first true 4K projection available, at a price!

ALL THE BEST BRANDS



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sound and vision



SMALL ENOUGH TO HIDE BUT SO BEAUTIFUL YOU WON'T WANT TO



INCREDIBLY SMALL SUBWOOFERS

The SPL Ultra Series may be easily hidden in a corner or built into a cabinet thanks to their compact size, sealed cabinet and single front firing driver design. But given their elegant sculptured styling in either real cherry veneer or gloss black lacquer, you will probably want to show them off! Either way you'll be amazed at the impact, bass extension and output of these compact subwoofers.

ROOM BASS CORRECTION

Every room is different, creating its own set of challenges in achieving top bass performance. For optimum bass for you, simply place the calibrated microphone in your favourite seating position, push the "EQ" button on the remote control, and the SPL Ultra subwoofer does the rest automatically, adjusting its digital equalizer to give the best bass performance for you.

Other features include:

- Intuitive front-panel interactive display
- DSP digital control
- 4 customized listening mode presets
- Full feature remote control



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AMPLIFIERS / SOUNDBARS

Amplifiers

Unison Research Simply Italy



Amplifiers are changing — many now have internal DACs for their digital input section and they're increasingly getting app control and access to streaming services. But their heart remains the ability to provide pure power to your speakers, a 'straight wire with gain'.

Make and model	Price	Award	AVHub	Website	
Marantz PM5005 integrated	\$590	W 2015		www.marantz.com.au	Our current entry-level award-winner, superb for the price and fully featured.
NAD D 3020 integrated	\$749	HC 2015	✓	www.nad.com.au	Reinvented for the digital age, NAD's classic '3020' gets a neat and still sound-first design.
Creek Evolution 50A integrated	\$1,999	W 2014	✓	www.audiodynamics.com.au	Modular design, all-electronic controls, high-quality output power in a slim chassis.
Bel Canto REF150s power amps	\$2,500	HC 2011	✓	http://absolutehiend.com	Class D power in a compact power amp with an amazing lightness of touch.
Aaron XX integrated	\$3,299	HC 2013	✓	www.aaronhifi.com.au	Faultless construction and impressive authority from this German anniversary product.
Unison Research Simply Italy integrated	\$3,399	HC 2014	✓	www.radiancav.com.au	Impeccable build, Italian flair and superb sound, as well as glowing valves to tempt you...
PrimaLuna Prologue Premium Preamplifier / Prologue Premium Stereo Power Amplifier	\$5,998	HC 2012		www.interdyn.com.au	Pricing is \$2499 / \$3499 for pre/power respectively, a feast of valve using EL34s or KT88s.
Bryston B135 SST2 integrated	\$6,999	HC 2014	✓	www.busisoft.com.au	State-of-the-art high-power low-noise Canadian amplification – DAC/phono are options.
Manley Labs Stingray iTube integrated	\$8,295	HC 2011	✓	www.krispyaudio.com.au	Retro-styled pure valve integrated – sweet treble, fluid midrange, and an iPhone dock...
Marantz PM-11S3 integrated	\$8,490	HC 2015		www.marantz.com.au	Exemplary facilities and construction matched by clean, clear and powerful sound.
VTL MB-125 monoblock power amp	\$8,995	HC 2015	✓	www.advanceaudio.com.au	Sweet yet hard-driving valve power amps, speaker-friendly as well as sonic beauties.
Yamaha A-S3000 integrated	\$8,999	W 2014	✓	au.yamaha.com	All stops were pulled for this superb engineering with huge power and 10-year warranty.
Devialet 200 integrated	\$10,500	W 2015	✓	www.interdyn.com.au	Unique tech, form and functionality from this French company out to reinvent audio.
Gryphon Atila integrated	\$13,195	W 2011		www.kedcorp.com.au	Linear power supply and output stage; stunning immediacy and clarity in a striking case.
Moon 700i integrated	\$14,595	HC 2012	✓	www.e-e.com.au	Built like a tank, comprehensively connectable, delivering 175W from dual-mono design.
Dan D'Agostino Master Systems Momentum Monoblock	\$75,195 pair	W 2013		www.advanceaudio.com.au	Dan D'Agostino's first product post-Krell – a stunner to look at, a thrill to hear.
Gryphon Mephisto integrated	\$83,395	HC 2013	✓	www.kedcorp.com.au	A massive Class-A stereo power amp from Danish high-end company Gryphon.
Musical Fidelity M3i integrated	\$1,595*	HC 2012		www.audiomarketing.com.au	*Now updated in a new M3si guise with more inputs and increased power
Marantz PM-KI-Pearl-Lite integrated	\$2,290	W 2013	✓	www.marantz.com.au	*Recent model – the 'Lite' version of the Pearl, but its performance is anything but light...

Soundbars and bases

Bowers & Wilkins Panorama 2



Soundbars sit in front of your TV, sound bases sit underneath your TV. They're not a true replacement for decent stereo or surround speakers, but the best do a good job improving on the thin sound from today's flatpanel TVs and make for enjoyable movie watching.

Make and model	Price	Award	AVHub	Website	
Denon DHT-T100	\$549	HC 2015	✓	www.au.denon.com	A small base but producing great sonic push for one so small, a good TV booster.
Yamaha SRT-1000 sound base	\$699	W 2015		au.yamaha.com	No HDMI but two optical, one electrical and one analogue input; great sound at the price.
ZVOX Z-Base 580 sound base	\$799	W 2014		www.qualifi.com.au	The unit that showed us bases have more space to make sound & less impact on décor.
Denon DHT-S514	\$999	W 2015	✓	www.au.denon.com	Slim soundbar with wireless sub, and one of the most musical soundbars we've heard.
Yamaha YSP-2500 surround sound bar	\$1,099	HC 2015	✓	au.yamaha.com	Loads of tech, with 3 HDMI inputs and Yamaha's long-developed Digital Sound Projection.
B&W Panorama 2 soundbar	\$2,699	HC 2014	✓	www.convoy.com.au	Stunningly powerful sound, cool design and more musical than its predecessor.
Yamaha YSP-5100 surround sound bar	\$2,999	HC 2011		au.yamaha.com	Yamaha uses 'beams' from 40 drivers to steer surround off walls for remarkable results.



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AV RECEIVERS / SPEAKER PACKAGES

WELCOME Our buying guide is based on the Sound+Image Awards we present each year – the very best value at each price level. We list all still-available products, varying categories each issue. This time we have all our speaker categories (stereo, wireless, packs and soundbars), plus AV receivers, projectors and amplifiers.

AV receivers

Yamaha's Aventure RX-A3040



The heart of any surround system, the AV receiver has been revolutionised by 'app' control and the inclusion of network streaming and online music services, but their core ability remains the delivery of clean and controlled amplifier power.

Make and model	Price	Award	AVHub	Website	
Harman Kardon AVR 151	\$599	HC 2014		www.convoy.com.au	One of the lowest-priced receivers we've reviewed offering high performance and value features.
Denon AVR-X1100W	\$899	W 2015		www.au.denon.com	Built-in Wi-Fi, Bluetooth, AirPlay and the usual Denon quality at an affordable price.
Marantz NR1605	\$1,150	W 2015		www.marantz.com.au	Efficient Class-D amplification is used to allow a 'slimline' form while being full-featured.
Harman Kardon AVR 171	\$1,199	HC 2014		www.convoy.com.au	Steps up from the AVR 151 by adding two extra amps, higher power, Bluetooth, AirPlay and more.
Onkyo TX-NR636	\$1,299	HC 2015		www.ambertech.com.au	Includes Dolby Atmos and a comprehensive set of features on par with its competitors.
Denon AVR-X4100W	\$2,499	HC 2015		www.au.denon.com	Utterly competent and sounding "first class", now Dolby Atmos capable and a fine performer.
Yamaha Aventure RX-A3040	\$2,899	W 2015	✓	au.yamaha.com	The state of the art, Yamaha's top integrated receiver took out our top award — yet again!
Rotel RSX-1562	\$2,999	HC 2013	✓	www.rotel.com.au	It may have less new media support but Rotel has focused on high quality sound.
Onkyo P-3000R/M-5000R	\$2,999 / \$5,799	W 2012		www.ambertech.com.au	Onkyo flagship electronics with an inherent ability to sound refined.
Yamaha CX-A5000 / MX-A5000	\$3,699 / \$3,699	HC 2014		au.yamaha.com	Statement receiver separates with Yamaha's best technologies.

Speaker packages

PSB Imagine speaker package

If you're after true surround sound, you need more than a soundbar! These packages provide matched 5.1-channel speakers (easily expandable to 7.1 or beyond), and since everyone is an award-winner, they each deliver top levels of performance and value for their price.



Make and model	Price	Award	AVHub	Website	
Boston Acoustics SoundWare XS 5.1	\$849	HC 2011		www.qualifi.com.au	Still great value, this neat 'almost-cubes plus sub' system is flexible and sounds impressive.
Pioneer FS52 speaker package	\$1,249	HC 2014		www.powermove.com.au	Amazing value for this Andrew Jones' designed 5.1 package. Contact Powermove for pricing.
Aaron MiniMax	\$1,349	HC 2012	✓	www.aaronhifi.com.au	Tremendous low frequency power combined with a versatile satellite speaker system.
Boston Acoustics A Series	\$1,999	W 2012		www.qualifi.com.au	A good value package that is less about OMG and more about getting the sound "just right".
Jamo 360 S35HCS8 speaker package	\$2,399	W 2014	✓	www.qualifi.com.au	Big music and movie sound from a small and stylish 'Omnipolar' package.
Dali Stile package	\$3,310	W 2011		www.dali.com.au	Presents a seamless soundscape that's immersive and involving. Excellent stereo performance.
Whatmough Synergy3 package	\$3,799	HC 2011		www.whatmoughaudio.com.au	Quality design in an attractive and room friendly lifestyle aesthetic. Powerful and deep bass.
KEF Audio T305	\$3,899	W 2012	✓	www.advanceaudio.com.au	Perfect mates for panels, the space-efficient T305 package performs like a much bigger system.
Aaron Hyperboloid 300 package	\$4,397	HC 2011		www.aaronhifi.com.au	System available with or without sub. Innovative drivers and good design result in thrilling sound.
PSB Speakers Imagine speaker package	\$7,146	W 2014	✓	www.qualifi.com.au	Beautifully-designed speakers that also sound superb from the 40-year-old Canadian company.
Pioneer FS51 speaker package	\$1,299*	HC 2012	✓	www.powermove.com.au	*Great Andrew Jones design, now superseded by the FS52 pack (see above).
Q Acoustics 2000i Series 5.1 Cinema Pack	\$2,116*	HC 2014		www.westan.com.au	*23cm-high sats, plus centre and unusual sub, excellent performance. Price varies with finish.
Krix Rhythmix speaker package	\$2,995*	W 2013		www.krix.com.au	*Superseded, but a Rhythmix/Sonix/Atomix/Seismix Cube set-up today would be \$3046.
Krix Acoustix/Graphix/Seismix 3 package	\$3,780*	W 2011		www.krix.com.au	*Original price. Most models from this are now in Mk II form, with even better performance.

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STAX



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Discover more at au.yamaha.com



R-N602 MusicCast Network Receiver



WX-030 MusicCast Wireless Speaker



Coming soon



YSP-1600 MusicCast Sound Bar



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